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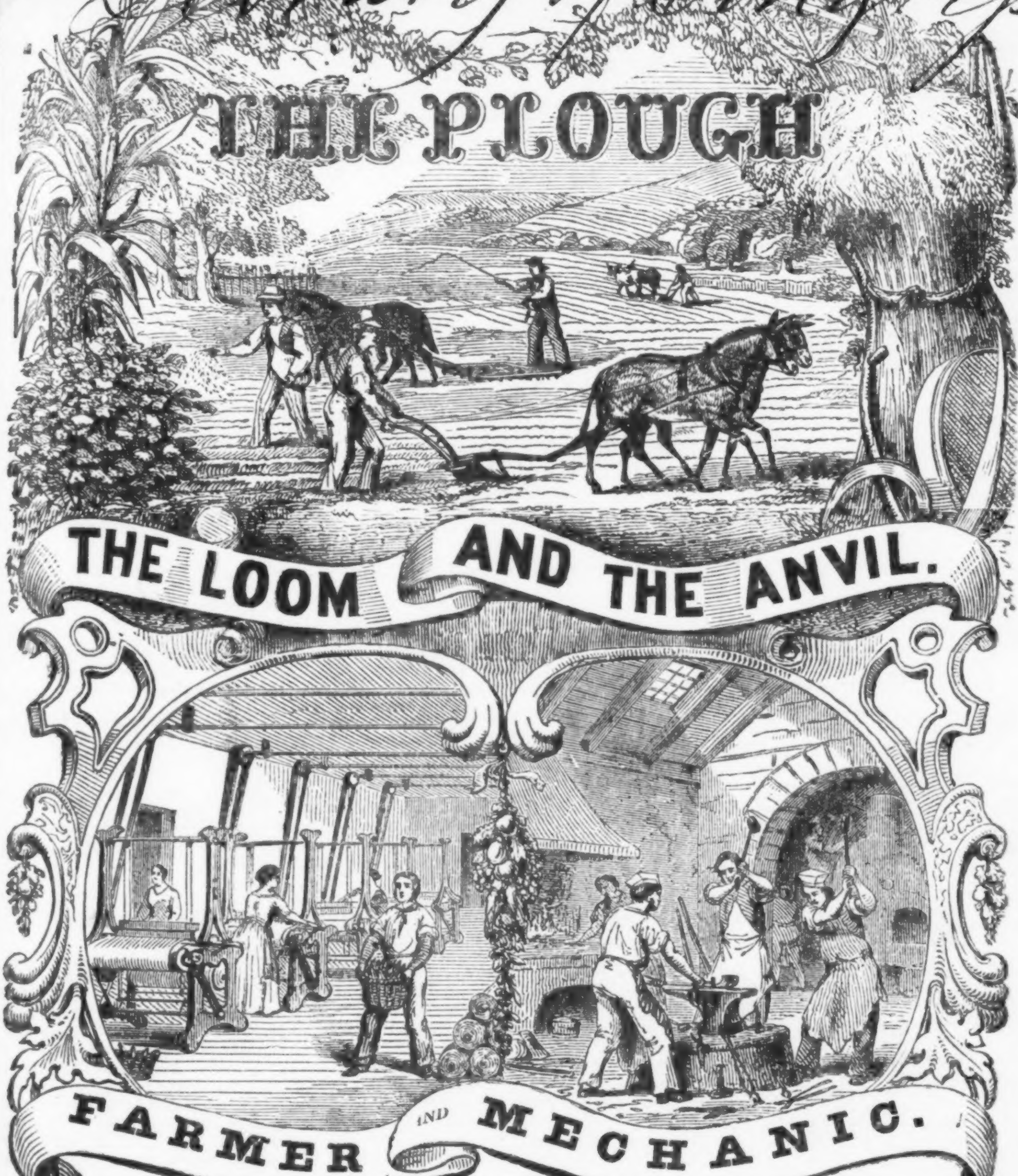

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The Plough, the Loom, and the Anvil

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The Plough, the Loom, and the Anvil.

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TEMPERATURE AND CLIMATE.

The great variety of the natural productions of the earth, both vegetable and animal, is essentially dependent upon the varieties of climate. Every locality has a fixed character in these respects, which is as undeviating as the law of gravity. But these phenomena, like the succession of day and night, or summer and winter, are too common and too uniform to excite our wonder or to attract attention. We close up our windows, and pile up our furnaces, when old Boreas, in his more furious moods, dashes the snow and rain against our houses, while we have no desire to look into the philosophy of storms. And when the heat of a summer's sun is poured down upon us without stint, we quietly seek the breeze and the shade; and while we are glad to escape the severity of his rays, we are indisposed to examine any deep mysteries or abstract sciences. This is, however, a department of philosophy quite too important, and too full of interest to be so generally neglected. We purpose to devote a small space to this subject.

We need not explain the general laws which regulate climate. Every child has learned that the great centre of heat is the sun; that whatever may form the mass of that huge orb, it is the origin of all the extraneous heat which warms the surface of the earth. No other heavenly body, and no other agent, visible or invisible, existing separately from the earth, has any material influence, independent of the sun, upon temperature.

Hence it must be true, that wherever the rays of the sun fall perpendicularly, there will be the highest temperature. As the direction of these rays becomes more and more oblique, the degree of heat from this source will proportionably diminish, and alike in all directions.

This being a general law, we have, at once, a key to the burning heat of the tropics, and the perpetual snow of the polar regions.

Were this the whole story, the task before us would soon be accomplished. But the phenomena of temperature and climate are not to be explained in so few words.

Why is it—for so it is—that Sitka, on the west coast of America, has a climate with an average heat 19° warmer than Nain, in Labrador, in the same latitude? Why is it that Tobolsk and Irkutsk, in Russia, have summers of a temperature like that of Berlin? and that Chesbourg, in Normandy, often maintains, for weeks together, a temperature of 86° or 87°? Stromness, in the Orkneys, nearly of the latitude of Stockholm, has a winter nearly as mild as London or Paris. Bordeaux is less than 1° south of the latitude of Boston, but has an annual temperature of 57°, while its summers average

71° and its winters 43°. And again, in the Feroe Islands, latitude 62°, the inland waters never freeze.

No part of the world produces more delicious fruits than are found at Astrachan, on the shores of the Caspian; and in Devonshire, England, the Mexican agave has been known to blossom in the open air, and the orange tree, trained against the walls, and protected from the winter's cold only by mats, has borne fruit. Thus the great Ice-King, as he surveys his broad domain, also discovers, here and there, the flowers and fruits of temperate, and even of tropical climes. We propose briefly to illustrate the influence of two or three of the principals of these disturbing causes.

The first to which we shall refer is ELEVATION. Mountains may be said to control the destinies of the world. Were the earth's surface a mere plane, there would be no seas. Were there no mountains, there would be no rivers; hence there would be no commerce, even were there merchants and sailors; or, in the emphatic language of one of the great geologists of the age, "Were the earth's surface perfectly level, we should have no springs of water, no rivers, no stone or lime to build with, no metals to make tools of, no healthy condition of the atmosphere, and but a very scanty and low existence of vegetable and animal life."

Whoever, therefore, would know the actual or possible conditions of man's existence, must become acquainted with the condition and the probable future developments of the material world. Constant changes are now going on upon the surface of the earth, which, if not interrupted, must materially affect the commerce of the world, and produce essential changes in the history, not only of towns and cities, but of nations.

We will refer to only one feature under this general head, which is among the most obvious, the *form* or *structure* of mountains. The *slopes* of all the prime ranges present a marked unformity in their arrangement. In the eastern continent, these ranges extend east and west, and their northern slopes are much more gradual and more extended than the southern. In the western continent, the great chain runs north and south, and the longer slope is towards the east. When we refer, as we presently purpose, to the important results of this arrangement upon the fertility of the regions which they traverse, we shall discover, if we do not already perceive, that this is a material point. Following this out on the globe, we learn that all the gradual and fertile slopes are towards the Atlantic and its dependencies, while all the sudden and precipitous slopes are towards the Pacific and its dependencies, and we shall find cause for further investigation. The precipitous slopes on the side of the Pacific have the appearance of having been broken off, as if this huge basin, in some distant epoch, had fallen in. And if we connect with this the undoubted fact, that the waters of the Pacific are now constantly subsiding, be it only to the amount of a foot in a hundred years, or in a thousand, the certain, though distant revolutions that must inevitably take place in the surface of the globe, must be of immense importance.

Such views as we have here developed, show us one mighty power which was in operation ages gone by, and is in operation now, carrying out, with the certainty of all natural law, one grand design, or at least tending to one changeless result. A destiny is in progress of accomplishment, commenced in the years that are gone, at a period utterly unknown and indeterminate. But we must not pursue this train of thought at present. We allude to it only to show the importance of the subject, and the interest which it is calculated to excite. We have a much humbler task before us. We are describing only one collateral result of this great system of operations, the ele-

vation of mountain ranges, as now existing, and that one only in its influence upon temperature, climate, and productions. Mountains control the fertility and climate of a country, by forming barriers to the clouds. These are driven by the winds against their lofty summits, and are there condensed and are scattered in showers over the regions below them. Hence it follows, that the regions of country thus watered are always fertile, while those on the other side may be dry and barren. This is sure to be the case where the mountains are sufficiently elevated. If they are otherwise, the two sides of the mountain may exhibit a contrast in the mildness of the climate, and in freedom from severe tempests, rather than in their degree of fertility. Illustrations of this are found all over the world. In those seas which are thus sheltered, the waters are emphaticallly quiet and *pacific*, while the termination of these chains is the boundary line of a region of storm. The winds, now uncontrolled, and even collected and concentrated, under a complex system of influences, roar and rage in terrible fury. Witness the regions south of all the great capes, and particularly those of Cape Horn and Cape of Good Hope. The extent of these phenomena will be found to bear a very marked ratio to the extent of the obstruction presented by these lofty ranges.

Mountains also affect climate and productions in another manner. It is well known to our readers that the temperature becomes colder as we ascend a high mountain. Why is this?

The warmth derived from the sun is not mainly direct, but indirect. Only about one third of the heat of the sun's rays is absorbed by the atmosphere, in their passage through it. The rest is absorbed by the earth. Hence it is that, in the protracted heat of summer, the side-walks and pavements, and brick and stone walls of the city are so much "hotter" than the free air of the country; and it is not until these substances have acquired a large amount of heat, that the atmosphere of the city becomes essentially warmer than that of the country.

An elevation of 350 feet is said to be equal to one degree of latitude, though all general results of this sort must be subject to many deviations, growing out of various other influences. The effect of mountains, both in protecting a country from cold winds, and also the effect of elevation upon temperature, are well illustrated in Switzerland. In this little country, not greater in extent than Vermont and Massachusetts, we find almost every variety of climate and productions, from those which belong to the tropics to those of the polar regions. Mountains also affect temperature in another manner. They are generally covered by forests, which are strangers to the axe of the husbandman; and it has been well ascertained that forests discharge one third more vapor into the atmosphere than the same surface of water. Effects of this kind are obvious in all new countries. Most of our readers have lived long enough to observe a difference of climates in our own region. Even that of New-England has changed perceptibly within less than fifty years, especially in the character of the winters.

Another mighty agent in controlling climate is the sea. While innumerable agencies are in constant operation to change the character of the sea, both in its component parts, its temperature, its density, its currents, &c., the sea is constantly exerting a controlling influence upon the climate of every country along its shores.

The effect of this influence is always against extremes, whether of heat or cold. So well determined is this agency, that some of our best scientific treatises recognize a continental and an island climate, the latter being always free from either extremes of temperature. We have already referred to one

of the counties of England. The climate of the whole island equally illustrates this influence. The account given by geographers of different climates will be found uniformly to sustain this distinction. Even that of Ireland is described as "mild." The islands on our own coast inculcate the same truth. Even amidst the severe winters of New-England, snow is seldom seen upon Nantucket, or even the islands nearer the coast.

In the north-east part of Ireland, lat. 54° 56′, the myrtle flourishes as luxuriantly as in Portugal. The mean temperature of Dublin, in August, is 60° 8′, while in Hungary, on the same isothermal line, or line of equal *annual* temperature, the temperature of August is 69° 8′. The mean *winter* temperatures of these two places are: Dublin, 39° 8′, and Bade, 27° 7′. The winter temperature of Dublin is more than 3° less than that of Milan. This difference is chiefly to be ascribed to the influence of the sea.

Peninsulas and capes exhibit the effect of this influence. We might refer to the climates of Italy and Hindostan. We find even the smaller promontories on our own shores exhibiting indubitable evidence of the same influence. Snow seldom lies upon the ground along the whole extent of Cape Cod, though so near the central temple of the great snow-king, who holds his court on the hills of the Granite State. All our sea-coasts have less snow than the interior.

The currents of the air exert, in certain localities, a very important influence on temperature. The British Islands lie in the track of a current from equatorial regions, and this unites with the agencies before spoken of, to prevent the occurrence of severe cold. In no part of the world, equally distant from the equator, is there less difference between the extremes of summer and winter. It scarcely amounts to 40°. Near the sea, the extremes are still less. Glasgow, Moscow, and Kesan are upon nearly the same parallel of latitude, but the mean temperature in January of Glasgow is 38° 23′, of Moscow 13° 57′, and of Kesan, 3° 45′. These remarkable differences are chiefly to be attributed to the causes we have already enumerated. Others might be named, but their efficiency is comparatively unimportant.

The configuration of the country also materially affects its climate. Even in these northern regions, how many illustrations of this influence might be given! There is many a quiet nook, in some hemispheric basin, scooped out among the hills, and sheltered by them from all cold winds, and at the same time exposed to the direct power of the sun. Were those conditions reversed, shutting out the sun and opening a path for the winds, the change would be very great. We once had a temporary home under the shadow of one of these lofty hills, which shut out the direct rays of the sun till 9 or 10 o'clock, and there have we seen the mercury more than thirty degrees below zero.

COTTON AND ITS MANUFACTURE IN GREAT BRITAIN.

The importance of increasing the extent of the culture of cotton, and multiplying the number of sources from whence it may be obtained, is every year becoming more apparent throughout the British dominions, and the interest with which the manufacturers of England are beginning to view the subject is constantly increasing. The fact that cotton and its extensive manufacture in all its varied branches is a very important item in the prosperity and commercial importance of that nation, is sufficient to awaken a degree of attention on the part of the Government itself, hitherto unprecedented. Mr. Bazley,

the Chairman of the Chamber of Commerce at Manchester, has recently lectured on the subject before the Society of Arts and His Royal Highness Prince Albert. Mr. B. very strongly urges the necessity of encouraging, by all possible means, the growth of cotton in the British colonies; stating that this necessity was rendered every day more urgent by "the limited supply from the United States, and the increased competition in the manufacture of cotton." The question has also been widely and freely discussed in various English journals, and there seems to be one general sentiment in regard to it, and this is the impression, that *it must be many years before the cotton mills of Lancashire can depend upon receiving any material proportion of the raw material from any other source than the United States.* "If this be so," he remarks, "and you cannot increase your cotton lands, nor, by improved cultivation, increase the produce of the present cotton-producing area, it is evident that the price of the raw material must rise, from the combined effects of a limited and stationary supply and an increased demand."

The following facts, connected with this question, present the matter in a somewhat striking light, and show the continual increase of the importation of cotton into Great Britain during the last half century:

In 1800 the raw cotton imported amounted to -	56,000,000	pounds.
In 1815 to - - - - - - - -	100,000,000	"
In 1835 to - - - - - - - - -	400,000,000	"
In 1851 to - - - - - - - -	700,000,000	"

or about 1,000 tons a day. For no less than seventeen twentieths of this raw cotton, Great Britain is indebted to the United States, the remainder being received from India, Brazil, and Egypt.

From the statistics of Great Britain, we learn that about one seventh part of the whole amount of cotton imported into that country is again exported in a raw state; therefore, not less than 600,000,000 pounds were manufactured in the British mills during the year 1851, and probably the proportion would hold good for 1852. The manufacture of this 600,000,000 pounds of cotton employs more than one and a half million of people annually. In the manufacture of the raw cotton, probably about one tenth part is waste, refuse, &c., leaving 550,000,000 pounds, one fourth of which only is required for home consumption, the other three fourths being manufactured into goods for exportation. The total value of the cotton manufactures in Great Britain during the year 1851, was estimated at £45,000,000 sterling, or nearly equal to $225,000,000, two thirds of which, it is believed, are paid in wages. Some of the statistics connected with the cotton trade are quite curious. About 800,000 tons of shipping are yearly employed by the various operations incident to this business. Every variation of a farthing in the pound upon the price of the raw material affects the annual consumption of Great Britain at least £500,000 sterling.

Mr. Bazley states that the cotton machinery of England "far exceeds that of any other country, although France takes the lead on fabrics; that cotton yarn has been produced so wonderfully fine in texture as to be imperceptible to the naked eye, unless placed upon a dark surface. The length of a hank of cotton is 840 yards; it would require more than 2,000 hanks of this gossamer cotton to weigh one pound. Twenty-five pounds of this delicate fibre would encircle the globe at the equator."

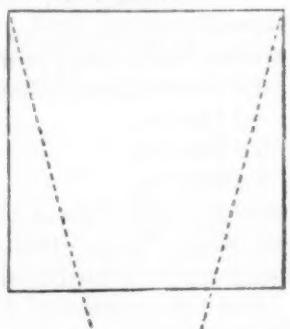
One other curious fact in regard to the manufacture of cotton in Great Britain is, that about *two hundred and fifty thousand barrels of flour*, costing not less than £750,000 sterling, or $3,750,000, are consumed annually in the process of starching the fibres while being prepared for weaving—an item of no small importance in the business.

PERSPECTIVE DRAWING.

We resume the subject of Perspective, commenced in the January No. We have already described the ground line, the horizon, the vanishing point, and the point of sight. We here beg the attention of the reader to one of two positions which, at first view, may seem paradoxical.

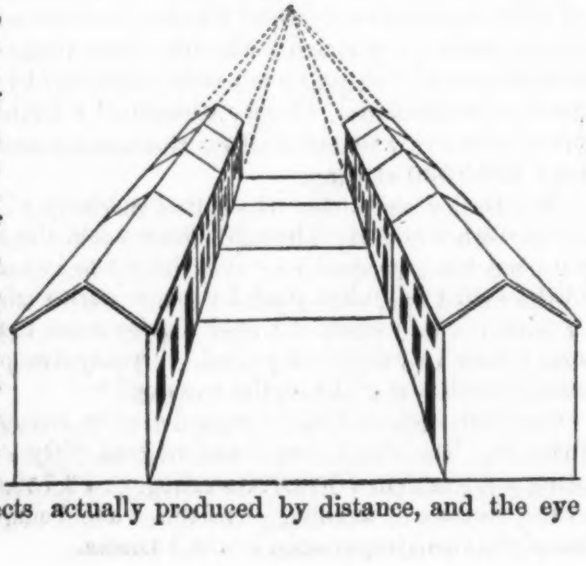
The first is, that lines bounding a horizontal plane, which meet at the vanishing point, should be regarded as parallel. But, *in fact*, they are so. The cube, already familiar to the eye of the reader, illustrates this. The lines bounding the opposite sides are parallel, or the figure would not be a cube. And yet these lines, if continued, will meet at the vanishing point. It is equally obvious that other parallel lines, in fact, do appear to approach as they extend towards the horizon. These are, therefore, *matters of fact*, and not the assumptions of artists or of book-makers.

Diag. 4.



But let us apply this principle to surfaces, as a square field, or an open square in a city. If you stand opposite one side of such a square, you see its two distant corners, or angles, between or within those nearer to you. Thus, in diagram 4, standing at A, lines from the opposite distant angles cross the front line at about half way between the centre and its terminations. Hence, it must result that the image of the square, in the eye of one viewing it, must be a perspective square, as seen in diagram 6; and it is but by habit, perhaps, or it may be by a sort of instinct, or likely by both united, we make allowances for distance, &c., and get a correct idea of shapes, distances, and sizes. These questions are, however, more satisfactorily settled by appeals to the senses than by any other means. Let us, then, take the perspective square of diagram 6, and retaining all its *actual lengths* and proportions, as they are there drawn, erect buildings upon it which shall also be drawn in perspective, as in diagram 5, and the illusion is at once obvious. The buildings come up to the line of the square, and the first division on each side extends exactly the depth of the perspective square of diagram 6, and all the cross lines represent similar squares and all appear in natural proportions. Another form of statement may now be quite clear, in reference to this. We cannot give actual, real distances and dimensions on paper, because a single sheet presents a view of objects that may extend many miles. Hence, we must give, on paper, representations of effects actually produced by distance, and the eye

Diag. 5.

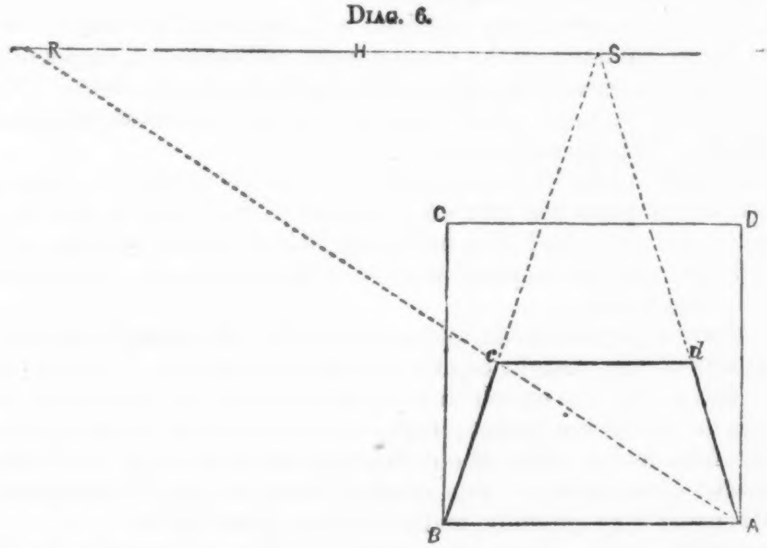


is completely deceived. When it sees on paper the diminished size produced by distance in natural scenery, it instantly transfers the idea of distance to the representation. Let any one not accustomed to drawing, measure off or trace a length of line which he thinks equal to the front of these buildings, in the 5th diagram, or the length of our first diagram in the January number, and he will probably guess wide of the truth.

But let us now be more explicit in relation to the change or changes produced by the distance of the beholder from the object. These effects are partly evident from the remarks made in connection with the 4th diagram, though more remains to be told.

1. The depth of the perspective square, *while the horizon is unchanged*, depends entirely on the distance of the beholder. The farther he is from the object, the less is the depth of the square. Practically, this is a very simple process. First select your *point of sight* on your picture plane; sec-

Diag. 6.



ond, draw a perpendicular through this point, at pleasure, and assume any distance you please, as the distance of the eye from the picture; set off this distance on the perpendicular, *from the point of sight*. The point thus selected is the *point of distance*. Set off this distance, also, on the horizon, from the same point, the point of sight, and this distance is called the RADIAL DISTANCE, and this point the RADIAL POINT. Thus, S is the point of sight, (the point of distance is beyond our limits;) SR the radial distance; A*c*, part of AR, is the diagonal of the perspective square; A*d* and B*c* are drawn towards the point of sight. The view being only a plane, the horizon will of course be beyond it, and *cannot* be within it, as we cannot see beyond the horizon. Buildings, trees, hills, &c., might, and often do, extend above the line of the horizon.

Select different points of distance, and of course different radial distances, the place of the horizon being unchanged, and note the effect of these changes on the perspective square.

Ere we begin to work out this and a few other simple problems, let us describe the instruments that are really *essential* for us in this service, and it will be seen that they are very few and very cheap.

1. A pair of dividers, or *a substitute.* A partial substitute may be a strip of strong paper, marked off in equal parts, large and small, as inches, half inches, quarters, &c. By this you can measure distances.

2. A square. A visiting card or a shop card is a very good substitute, but be careful to get one that contains true right angles. Test it by turning it over, and observing whether both results agree.

3. A thread, of which one end is tied loosely round a pencil, and the other attached to a pin, is a very convenient instrument for describing circles and shorter curves.

4. For "parallel lines." First draw one line, the lower one, perhaps. Make points on the edge of a piece of paper, at a distance from each other equal to the required distance between your two parallels. Applying one of these points to the line already drawn, the edge being perpendicular to it, point off the required distance. Do this at each end of the line drawn, and draw the second or parallel line through these points. Or you may use the strip of paper mentioned in diagram 1.

5. A card, with a semicircle described on it, and radii for every 5° or 10°, with the degrees marked on the circumference, will answer for most purposes, in place of a brass semicircle, when given angles are to be drawn. Or,

6. To describe an angle of 45°, cut out a square very accurately, and fold it diagonally. This gives it to you.

For an angle of 30° fold a quarter of a circle fanwise, in three parts. Folding it in two parts will give 45°. Repeated folds will be more liable to inaccuracy. So one third of a half circle, folded in like manner, will give 60°. All these can be prepared with no other instruments than scissors, a pin, thread and pencil.

7. To draw a perpendicular, fold a paper, with one straight edge, so that the two parts of this straight edge will exactly correspond. Then apply this straight edge to the line on which the perpendicular is to be drawn, placing the crease at the desired point; make a dot with a pin or sharp pencil at the points from and to which the desired perpendicular must be drawn.

8. Instead of an expensive rule, or other "straight edge," for any purposes, fold thick paper very carefully, and guide your pencil by it.

Thus furnished with all necessary instruments, let us undertake the following problems:

1. Draw a cube on the ground line, having its front face 1½ inches square, and the point of sight 4 inches directly above its centre, and its radial distance 5 inches.

2. Form an oblique parallelogram, (as in diagram 3,) resting on the ground line, the perpendicular height of which is 1½ inches, the horizon line being 3 inches above the ground line, the point of sight directly over the point where the object touches it, and the vanishing points being 3 inches each way from the point of sight.

3. As before, except that one vanishing point is 2 inches from the point of sight, and the other 4.

4. Draw a block of buildings 2 inches wide and 2½ high, on the ground line, towards a point on the horizon which is 4 inches to the left (west) of the centre of the end of the buildings, the horizon being 4 inches from the ground line. The result will be nearly like diagram 1.

5. Modify these conditions, and draw as many forms as you can, both oblique and direct.

LABOR AND GENIUS; OR THE INVENTION OF ENAMEL.

Bernard Palissy was born in the sixteenth century, it is believed in Saintes, the little capital of Saintenaye, a department lying north of the mouth of the river Garonne. He was born poor, and received in his childhood no more than a peasant's education, except that, through his father being a glass-worker, he learned to draw and paint a little upon glass. At the proper age he followed his father's business, but one day being shown an earthen cup, turned and enamelled with much beauty, as the Etruscan and Grecian vases were, he forthwith began to reflect if he could not discover how to make enamels. He had no knowledge of clays, of chemistry, nor the means of travel or historical investigation. As a man groping in the dark did he begin a patient and long-protracted search, struggling with poverty, with the mute reproaches of a starving family, and the indignant remonstrances of a wife and friends, in endeavoring to obtain the baffling secret of *enamel*-making. Perhaps a more touching picture of lofty self-devotion to great objects amid discouragements was never presented than in some of the narratives of his efforts :—

"Henceforth his work was to be private, and he was to produce very soon, he believed, illustrious results. A furnace like that of the glass-workers sufficed, as it was proved, for the melting of his enamel. He must have such a furnace in his house, or rather in a shed appended to his house, which, at that time certainly, was situated in the suburbs of the town. But they were miserably poor. Bernard having found means to obtain bricks, perhaps upon the credit of his future earnings, could not afford to hire a cart for their delivery upon his premises; he was compelled to journey to the brick-field, and to bring them home on his own back. He could pay no man for the building of the furnace; he collected the materials for his mortar, drawing himself the water at the well; he was bricklayer's boy and mason to himself; and so with incessant toil he built his furnace, having reason to be familiar with all its bricks. The furnace having been at length constructed, the cups that were to be enamelled were immediately ready. Between the discovery of the white enamel and the commencement of the furnace, there had elapsed a period of seven or eight months, which he had occupied in experiments upon clay, and in the elaborate shaping of clay vessels, that were to be in due time baked and enamelled, and thereafter, on the surface of the enamel, elegantly painted. The preliminary baking of these vessels in the furnace was quite prosperous.

"Then the successful mixture for the white enamel had to be tried on a larger scale—such a mixture as that which Luca della Robbia had found 'after experiments innumerable.' Its proportions we do not know; but the materials used include, Palissy tells us, preparations of tin, lead, iron, antimony, manganese, and copper, each of which must exist in a fixed proportion. The materials for his enamel Palissy had now to grind, and this work occupied him longer than a month without remission, beginning the days very early, ending them very late. Poverty pressed him to be quick; intellectual anxiety to witness a result was not less instant in compelling him to labor. The labor of the grinding did not consist only in the reduction of each ingredient to the finest powder. When ground, they were to be weighed and put together in the just proportions, and then, by a fresh series of poundings and grindings, they were to be very accurately mixed. The

mixture was made, the vessels were coated with it. To heat the furnace was the next task; it had to be far hotter than it was when it had baked his clays—as hot, if possible, as the never-extinguished fires used by the glass-workers. But Bernard's fire had been extinct during the days of grinding: poverty could not spare a month's apparent waste of fuel.

"Bernard lighted then his furnace-fire by two mouths, as he had seen to be the custom at the glass-houses. He put his vessels in, that the enamel might melt over them. He did not spare his wood. If his composition really did melt—if it did run over his vessels in a coat of that same white and singularly beautiful enamel which he had brought home in triumph from the glass-house—then there would be no more disappointments, no more hungry looks to fear; the prize would then be won. Palissy did not spare his wood; he diligently fed his fire all day—he diligently fed his fire all night. The enamel did not melt. The sun broke in upon his labor, his children brought him portions of the scanty household meals, the scantiness impelled him to heap on more wood, the sun set, and through the dark night, by the blaze and crackle of the furnace, Palissy worked on. The enamel did not melt. Another day broke over him; pale, haggard, half stripped, bathed in perspiration, he still fed the furnace-fire, but the enamel had not melted. A fourth day, and a fourth night, and a fifth and sixth—six days and nights were spent about the glowing furnace, each day more desperately indefatigable in its labor than the last; but the enamel had not melted.

"It had not melted; that did not imply that it was not the white enamel. A little more of the flux used to aid the melting of a metal might have made the difference, thought Palissy. 'Although,' he says, 'quite stupefied with labor, I counselled to myself that in my enamel there might be too little of the substance which should make the others melt; and seeing this——' What then? Not, 'I regretted greatly the omission;' but, 'I began once more to pound and grind the before-named materials, all the time without letting my furnace cool. In this way I had double labor, to pound, grind, and maintain the fire.' He could hire no man to feed the fire while he was sleeping, and so, after six days and nights of unremitting toil, which had succeeded to a month of severe labor, for two or three weeks more Palissy still devoted himself to the all-important task. The labor of years might now be crowned with success, if he could persevere. Stupefied, therefore, with a work to which many a weaker body would have yielded, though the spirit had maintained its unconquerable temper, Palissy did not hesitate, without an hour's delay, to begin his entire work afresh. Sleeping by minutes at a time, that he might not allow the supply to fail of fresh wood heaped into the furnace, Palissy ground and pounded, and corrected what he thought was his mistake in the proportions of the flux. There was great hope in the next trial; for the furnace, having been so long alight, would be much hotter than it was before, while at the same time the enamel would be in itself more prompt to melt. All his own vessels having been spoiled, —the result of seven months' labor in the moulding,—Palissy went out into the town, when his fresh enamel was made ready, and purchased pots on which to make proof of the corrected compound."

For more than three weeks Palissy had been imprisoned in the out-house with his furnace, weary, unsuccessful, but not conquered. The vessels which his wife had seen him spend seven months in making, lay before her spoiled! Every thing seemed hopeless to her. He, exhausted in body, in debt, wood gone, food nearly gone, was forced to burn even the palings of his garden,

and the floors, tables and chairs of his house, to keep his small furnace at full heat. His clay-pots were broken; the citizens declared him mad, or a forger, as he walked the streets, yet he could not give up his devotion to an idea! He failed, tried again, and again failed, but he knew success *must* come. At last the enamel melted. Eureka! it was found. But no! his work was again spoiled for another reason. The mortar of his furnace was filled with pieces of flint, which, flying off through the heat, stuck upon the glutinous enamel, and so rendered the whole comparatively worthless. True, he might have sold these damaged pieces for something. "But," he says, with that lofty grandeur deserving of success, "it would have been a decrying and abating of my honor, so I broke in pieces my entire batch from the said furnace, and lay down in melancholy."

We have not left ourselves room enough to speak at length of his indomitable struggles, and how, from a poor potter, manipulating his clay in open field, and baking his brown wares in a wretched hovel, his genius and perseverance elevated the pursuit to the first position amongst the arts, and has now obtained for its operators the highest remuneration of artisans. Neither have we room to describe all the steps of Palissy's progress till kings and nobles became his patrons—and finally, his dignified and uncompromising attitude, when religious bigotry threw him into a Bastille to end his days, because he was a Huguenot. These episodes of his heroic martyr-life we cannot detail; but enough is said to let our own country's lowly workers see how glorious is his brotherhood who, from shapeless earth-brown wares, moulded forms of surpassing elegance, and converted the degraded manipulator into a skilful and scientific artist. May it be an incentive to attempt also some noble efforts.

HOT-BEDS.

The following seasonable remarks we presume were written by that judicious horticulturist and gardener, J. J. Thomas, for the *Albany Cultivator*:—

We can state briefly, in answer to the inquiry of Heman C. Orcutt, of Taftsville, Vt., for the cheapest and best mode, and the time, of making hot-beds for forwarding plants for the garden, that the mode must vary somewhat with the proposed objects. If it is intended to forward plants quite early, so as to have them far in advance of ordinary crops, a different mode must be adopted from merely giving them a start of two or three weeks. In the former case, large masses of fermenting manure will be needed in order to retain the heat a long time, say at least three feet and a half high, and extending a foot on each side beyond the frame, or else placed in a walled pit; in the latter, a bed of manure two and a half feet thick will answer. The manure should be the strongest and best fresh stable dung, and should be well shaken up a few days before using. It should be lain in even layers, and beaten down at each course; and unless in a pit, the bed must be made much the heaviest or most solid outside, or that part will settle too much, and leave a swelling in the middle. For the locality of our correspondent, hot-beds need not be made, for ordinary purposes, much before the first of April. When finished, the frame and sash must be put on, to retain the heat. The sash is best if made in separate pieces, keyed together, so as to be easily taken apart when not in use. If the bed is five feet wide, the back (from the sun) should be about ten inches higher than the front. In a day or two after it is

made, its upper surface, within the frame, is to be covered with several inches of the best garden mould. This will be heated enough in two or three days to sow the seeds. During warm days, or if there is sunshine, air must be admitted. Sometimes a few minutes' neglect, when the heat is streaming up from beneath, and the sun's rays pouring down from above, is sufficient to scorch and destroy the plants. On cold frosty nights, a mat or blanket should be spread over the glass.

Cabbages, and other plants which are transplanted without difficulty, may be sown at once in the mould of the bed. But cucumbers, melons, &c., should always be planted in small blocks of inverted turf, which admits of their removal to open ground without tearing the roots or checking their growth.

THE MECHANICS OF WHEELS.

We are disposed to inquire a little further of our mechanical readers, whether the common doctrine of the lever, as applied to wheels, is the true one. No careful student will doubt that there are certain positions assumed or supposed to be proved by mathematical expounders of mechanics, in years gone by, which are, at best, of doubtful accuracy. Indeed, this is true, we suppose, in all the sciences; chemistry affording, no doubt, the greatest number of such cases, and those capable of mathematical demonstration the fewest. But the *mathematics* of the theory may be correct, while in the application of names, &c., there may be much error. Several systems of astronomy were admirable, in most respects, long before the time of Copernicus. Eclipses were foretold, for aught we know, with as much accuracy then as now; and charts of the heavens, the dates of which run back far into the past, are worthy even of modern map-makers. The pump was just as effective when its power was attributed to "suction" as now, when its philosophy is better understood.

We are inclined to call attention to the commonly received notions of the philosophy of wheels. The actual merits of the different sizes, &c., we doubt not, are well understood and accurately defined. But the *form* of the explanation may, at the same time, be objectionable.

Our first query is this: Is the ground ever properly called *a fulcrum?* Let us test this matter.

We will suppose a carriage-builder finds his axle too tight in his boxes, on account of some irregularity of surface, either in the axle or in the box, and he is inclined to wear away the resisting surfaces by friction, and he sets the boy to work turning the wheel by hand. The axle is placed in a vertical position, and of course the wheel is horizontal. As a matter of convenience, he applies his hands, his force or *power*, to the circumference of the wheel, and this he turns and turns, until a given point in that circumference has moved many miles. Where is the fulcrum in that operation?

We answer, first, it is not the ground, for the ground is not in contact with it; and second, it is not the hand, for the hand is the power, and the only power which is exerted on the wheel. The resistance is the friction on the surface of the axle.

If this is utterly and practically too plain for denial, then we have "a lever," with the power at the circumference of the wheel, the resistance or weight at the circumference of the axle, and a fulcrum "elsewhere," for it is surely not at either of these points.

Now we ask, secondly, whether the "*lever-power*" of this wheel is not precisely the same when it stands on the floor of the shop, and also whether it would not continue the same if perchance a horse should be fastened to it? If so, then the ground *is not a fulcrum*, unless a power and a fulcrum can change places *without affecting the power* (*ability*) *of the lever*. So far we refer only to the resistance at the axle.

So far as the lever-power of wheels is concerned in overcoming obstacles, we have already given our views (the views of all scientific men, we suppose) at sufficient length. But we now come to another point.

When any motive-power causes a wagon or cart to advance on a level floor, what is done? The wheel, clearly, revolves around the axis. The friction is just the same, whether the axle moves forward, or whether the wheel is turned while the axle is stationary. The resistance to be overcome on a level floor, is the IMMOBILITY *of the load*, the INERTIA of the weight to be drawn. It is not gravitation, for this may amount to tons, while, perhaps, a mere boy can push it backwards and forwards. It must be only the inertia and a slight addition for the friction of machinery. The inertia, of course, is more or less according to the amount of matter to be moved. The friction is that of the axis in the box. Now suppose there is the same smooth surface, not movable, but fixed and extended, on which the axis rests, worn smooth, and equally well lubricated, with equal extent of surfaces in contact, what wonderful change is there in the force to be exerted by the motive-power? We cannot see any essential change from the axle. Where, then, is the lever? Does it consist in the height of this *track* from the ground? This would be too absurd to deserve any consideration, and if so, there is no lever. And if there is none here, there is none in the wheel when moved back or forth *on that same smooth plane*.

When we come to obstacles, a new problem is to be wrought out, and different machinery comes into action. We have already given two modes of measuring the lever-power of the wheel under such circumstances, both being exactly the same in principle and in result. But neither is applicable where there is no obstacle. They *cannot* be applied except in connection with an obstacle.

To what conclusion, then, do we come? Manifestly that in overcoming friction at the axle, the ground is not a fulcrum, and that on a smooth surface there is *no lever* in our arrangement of wheel carriages, and, of course, no fulcrum any where.

What, then, is the advantage of wheels? We answer: First. They are of use because it would be impossible to build an elevated track on which carriages can run, to any good purpose, in all directions, as a wheel carriage can be moved. But again we say, there is a gain from the use of wheels, even over smooth surfaces. When a sleigh is drawn over snow, or when any other mere sliding arrangement is used, the extent of the friction is equal to the distance travelled. In other words, the surfaces in contact must slide over each other, just to the extent that progress is made. But with the wheel it is not so. At one revolution of a wheel 15 feet in circumference, we secure a progress of 15 feet, while we have a friction only to the extent of the circumference of the boxes, which, if the axis is iron, will be only some 3 or 4 inches. This gain is of some consequence, though less than some of the elements which go to make up the resistance to be overcome by the motive-power.

Besides this form of *track*, a *movable* track is also of great advantage in allowing all conceivable changes of position, of direction, of elevation,

&c., while, as already remarked, it is impossible to provide for all these conditions in any other way.

In thus setting right the common opinion, we are not attempting to set right scientific men or scientific theories. We have yet to see the diagram, in any published treatise, which undertakes to give the parts of a lever, as applied to the wheel, when there is no obstacle to encounter, and the first description in any scientific treatise which necessarily leads us to suppose that the author's views on this matter differ from our own.

The result, therefore, is obvious, viz: that wheels act as levers *in overcoming obstacles*, while on smooth surfaces they are but movable tracks, on which the carriage slides, with a positive gain in the matter of friction, inasmuch as the friction is limited to the circumference of the axis in a single revolution, in place of the circumference of the wheel.

FOR THE PLOUGH, THE LOOM, AND THE ANVIL.

CISTERNS FORMED BY CEMENT—HYDRAULIC RAMS.

A NOTICE in the February number of your periodical, taken from the *Granite Farmer*, describing cement cisterns, has attracted my attention, and reminded me of what is doing in the county of Lamoille. There were many citizens the last season who adopted the method of cement cisterns for containing rain water from the eaves of buildings, and also that conveyed from springs by aqueducts; we are also having our cellar bottoms covered with the cement: it makes the cellar clean; food keeps much better and sweeter in those thus coated; they may be swept and washed as well as a board floor, and are a guaranty against rats and other vermin.

Aqueducts are being laid with it, and how durable they will prove, time will determine. The mortar is placed round an iron rod, when this is drawn forward with a circular motion, as occasion requires, and thus you may proceed to any distance required, leaving the aqueduct in one continued line.

We have a cistern in the highest part of our village said to contain 50 hogsheads. A hole is dug in the alluvial sand, flaring from bottom to surface. The bottom is level. The mortar is spread on the bottom and sides, two coats between two, and 3 inches in thickness; the bottom is 7 feet in diameter, the top over 8, and it is over 7 feet in depth.

A house is erected over the cistern, and no inconvenience is experienced from frost. An enterprising citizen of our village has put in an hydraulic ram, 97 feet below the cistern, down the slope of our plain, towards the river, where is a large spring fed from our plain. The quantity of water is apparently always the same, and very warm in winter. From this spring, water is forced by the ram 97 feet into the cistern.

A dam is formed near the spring, and the water conveyed in a trough 12 rods to a cistern: from this a two-inch drive-pipe conveys the water to the ram 41 feet, and a fall of 12 feet, and 41 rods from the cistern in the village.

When the apparatus is in good condition, it will throw 50 gallons per hour; that is, when the air-chamber has recently been filled with air; it being evident that the elasticity of the air forces up the water: the more air the chamber contains, the greater the quantity of water thrown into the cistern. The air being continually absorbed by the water, causes the flow of that to diminish, and when the air is exhausted, the water ceases to flow. Then the chamber

has to be removed and again filled with air, which does not exceed 5 days. The chamber is glass, which is very convenient, as readily showing the quantity of air it contains; when the chamber is removed and filled with air, by letting in the water through the drive-pipe, the air is compressed to one third of its original bulk, which will convey some idea of the great pressure required to force water 97 feet. There is a deficiency in these rams that must be improved. There should be a small orifice to let air into the chamber at every stroke of the forcing-valve. The *Scientific American* I saw to-day, asserts that this deficiency is obviated by Montgolphin, of France, by two sniffle-valves. From this cistern there are several distributing pipes, conveying water to the several dwellings supplied from this fountain, to the great advantage of the inhabitants of this dry plain. ARIEL HUNTON.

Hydepark, Vt., Feb. 25, 1853.

FOR THE PLOUGH, THE LOOM, AND THE ANVIL.

ONONDAGA COUNTY—ITS SALT WORKS—PRODUCTIONS, ETC.

PERHAPS there is no county in the State of New-York possessed of so many natural advantages as Onondaga. We have limestone, gypsum, slate-rock, various kinds of clay, chalk, and some considerable granite. Our lime is very valuable, not only for building purposes, but it is a most excellent thing to apply to heavy, clayey lands. In Manlius, plaster of Paris is found in great abundance; but I am inclined to think that it is not used quite so liberally as it was eight or ten years since. It is taken in the stone to different parts of the county, and is then ground up for use. The Onondaga salt springs are extensively known. The product of salt from these springs is immense. Many hundreds of thousands of bushels of salt are manufactured annually from the Salina and other springs around Onondaga lake. This season, the proprietors of the different blocks entered into an agreement not to make more than 20,000 bushels from each work. In future, it is expected on the part of the proprietors of the works, that salt will be manufactured at a much cheaper rate than it has been within the past few years. The reason of this expectancy is, that coal will be bought cheaper in the Syracuse market, for time to come, than formerly; and the cause of this change in the price of coal must be ascribed to the fact, that we are shortly to have a railroad completed from Binghamton to Syracuse, thus connecting the latter place with the Pennsylvania coal mines, and hence the reduction in the price of pabulum. The salt works will undoubtedly make use of coal instead of wood, for it is calculated that one ton of coal will go as far towards boiling down the brine as two cords of wood. If coal can be furnished in the city of Syracuse for $3 per ton, as doubtless it can be, it would certainly be wise policy in "salt-boilers" to purchase it in preference to wood, for the latter article uniformly brings about $4 per cord in the vicinity of the works. It is worthy of remark, however, that timber is getting to be a scarce article with us in Onondaga, and perhaps wood will never be cheaper than it now is, in consequence of the introduction of coal as fuel.

The *vats* used for making solar salt cover an area of about 140 acres, and the number of bushels which are annually manufactured by evaporation is 200,000. It is a very simple process which reduces the brine to solar salt. Large square vats are made, into which the brine is allowed to flow from tubes of wood, (called "pump-logs;") and when the vats are nearly filled with

the water, it is exposed to the sun's rays, and when the *aqua* (water) is evaporated, beautiful quadrangular and hexangular crystals make their appearance. This is the process which is carried on very extensively, at the present time, at Salina, Syracuse, and Liverpool.

In regard to the quantity of salt which all the works manufacture annually, it would be safe to say, that not far from 5,000,000 of bushels are made every year. When all the works are in operation, about 1,000 cords of wood are consumed daily. How many teams, hands, and boatmen, then, must be employed in keeping the works in fuel? To say the least of it, the business of manufacturing salt at Syracuse is immense. Every year, vats and works are being put up; and the idea has been thrown out frequently among us, as well as elsewhere, that we can make as good an article of salt in Salina as can be found in any other part of the globe.

We have a great variety of soil in this county. In the eastern part, there is limestone, clay-slate, and some alluvial deposits. In the western part, we have chestnut-soil—that is to say, soil of a light and sandy nature. It is excellent land for wheat, and will produce almost any thing that is common to our climate. Red slate is found along the Seneca river, (a beautiful stream,) and marl is abundant in almost every swamp in the western part of the county. I think the corn crop succeeds about as well in the western portion of the county as any which we can raise; and oats, barley, wheat, &c., do exceedingly well.

We have many thriving villages in Onondaga. Jordan, Elbridge, Fayetteville, and Baldwinsville, are all fine, lively towns. Syracuse is getting to be truly the "Central City," as all of our State, and numerous other Conventions, are held at this enterprising and wealthy city. It is destined to become one of the largest places in our State. W. Tappan.

Baldwinsville, N. Y., February, 1853.

NEW MANUFACTURES AND INVENTIONS.

Marbleized Iron.—The manufacture of iron imitations of marble has become an extensive branch of business in this city, although it is but little more than a year old. One establishment, that of Mr. S. C. Herring, employs some fifty workmen; that of Messrs. J. H. Keyser & Co. some thirty-five. There is also a third manufactory, which we believe employs some thirty-five men. This process of giving a marble-like surface and polish to iron was, we believe, invented at Cincinnati. It was brought here, as we learn, by two brothers named Williams, who are now in the employ of Mr. Herring, and it has been improved and shortened by Messrs. Keyser & Co. It is not patented, but is kept secret, being only imparted on the oath of the recipient that he will not reveal it. The process has been and now is chiefly used for mantel-pieces, but we fancy that it will hereafter be applied to many other purposes, even if it should become less fashionable for that. It may be used to imitate any sort of wood, or any other polished surface, as well as that of stone—the closeness of the imitation depending solely on the skill of the artist by whom it is prepared. Some of the mantels we have seen are very handsome, and exceedingly like marble, though on careful examination by a skilful eye, iron casting cannot pass for sculptured marble. The cost of the mantel-pieces is about the same for the more ordinary kinds as the cost of marble ones; but the imitations of the more expensive sorts of marble, of agate, or of other

valuable kinds of stone, can be produced for a fraction of the cost of the real thing. Thus for $60 you may have an iron mantel the counterpart of which in stone could not be obtained for less than $500. This greater cheapness accounts for the use of an immense number of these mantels; and we do not regret it, for, apart from all considerations of durability, it develops the taste for elegant and graceful forms, and will carry beauty of that kind into many houses where it would otherwise not enter. With regard to durability, only experience can decide, and on that head, from the short time since the introduction of the article, we are unable to speak. We notice, however, that care must be taken not to hit a hard blow upon the surface, and not to scratch it. If you scratch marble, the furrow only reveals the same substance as you beheld on the exterior, but with polished iron the case is very different. While, then, we recommend no one to adopt it who can afford to have the true thing—for nothing is less desirable in itself than a casting which attempts to pass for the work of the chisel—we hold these mantels to be a great deal better than any of the previous imitations of stone that we have met with. Should experience prove them to be as durable as they are handsome, the manufacture must grow to truly gigantic proportions.

The same mode of giving a stony face and polish may be applied to wood, plaster of Paris, terra cotta, and other substances, as well as iron. It is far superior to scagliola in every respect, and must expel that substance from use altogether. We look to see it applied most extensively, especially in architecture. It makes very handsome pillars, pilasters, and vases for the inside of houses.

Another Mode of Imitating Stone.—A different way of producing a result similar to that above spoken of, has been discovered by Prof. Freund, a Hungarian chemist, for some time resident in this city, and is used by Messrs. Freund & Miller, at their factory over the Harlem Railroad dépôt. It is chemical and mechanical, the imitation of stone being produced entirely without the pencil of a painter. The elements of the stone desired to be imitated are chemically combined, and finally polished by grinding or rubbing with water, pumice-stone, &c., much as the stone itself would be. For architectural purposes, this process produces very beautiful work, far superior to any scagliola; we have seen pillars and wainscoting with all the loveliness of the finest jasper or agate. It has hitherto been mostly applied on wood, but may also be put upon iron. The imitation mantels on wood we are told will stand fire, but have seen no experiments. This establishment employs a large number of Hungarian exiles.

Spring Mattresses.—The spring mattress is well known as an attempt by means of spiral springs to combine the advantages of a mattress with the luxurious, yielding softness and comfort of the feather bed. To sleep on feathers is unhealthy, from the fact that they are too warm, and enervate the sleeper as a warm bath would do. At the same time, there is something delicious in sinking into the downy mass of an old-fashioned bed which the modern sanatory ideas may condemn, but cannot banish from mind. The ordinary spring mattress is but a poor attempt to reproduce this luxury without its objectionable features, and indeed nothing can do it perfectly; but we have examined an article of recent French invention, manufactured by Messrs. Mauritz & Demeure, of Centre street, which is very ingenious, much superior to the ordinary spring mattress. The springs are made of copper wire, set upon iron slats which are fixed at the bottom of an iron frame. At the top, the springs, instead of being connected together by wooden slats, rudely fastened, as is the case in the ordinary spring mattress, are united by smaller spirals,

also of copper wire, which cross the mattress from side to side, and from end to end, connecting the several ranges of springs in each direction, and giving the most equal elasticity and yieldingness possible to every part. So firmly are the springs fastened, that it is not necessary to envelop the mattress in a tick; it has no cover, and offers no retreat for vermin. A thin mattress of hair or moss upon it is all that is necessary.

Blake's Nut-Cracker.—This is a Yankee notion, having sprung into being at New-Haven in the same month of the same year with Louis Napoleon's *coup d'état.* It is designed to dispense with the use of the hammer as well as with that of the ordinary table nut-cracker, for nut-cracking purposes. It is not adapted for table use, but, as we can testify, cracks the hardest shells in a way to render all further cracking superfluous. It consists of a pair of pincers fixed upon a bit of board. You put in your nut, press down the handle, the nut passes into a new condition, and as you remove your hand from the handle, a spiral spring casts it up, and the transformed nut drops into a basket, which ought to be standing below on purpose to receive it. A smart crackster ought to crack as many as 20 nuts in a minute, or 1200 in an hour, without any danger of pounding the fingers.

Iron.—The following in an account of a new mode of producing *wrought iron* directly from the ore, with anthracite or bituminous coal or wood, patented by Alexander Dickerson, of Morristown, N. J., which is said to have been verified by sufficient experiments :

"Two concentric upright cylinders, well protected from burning by water plates, are erected over a preparatory bottom, which is built between the puddling bottom and stack of an ordinary puddling furnace, so that a portion of the escape heat passes freely within the inner cylinder and between the outer one and surrounding masonry work. The space between the cylinders, measuring about seven inches across, is charged from the top with crushed ore and pulverized coal suitably mixed. As the escape heat, which is regulated at pleasure, passes freely around this mixture, (but without the flame coming in direct contact with it,) the ore readily yields its oxygen, and absorbs a requisite quantity of carbon. A batch of the ore is then, by an easy arrangement, let down upon the preparatory bottom, where the process of deoxidation is soon completed, when the metal is passed over upon the puddling bottom, where it is made up into balls, ready for the rolls or hammer. As the cylinders are of sufficient capacity to contain several batches at once, and a uniform heat is supplied, without intermission, while one portion of ore is being let in at the top, another may be discharged on the first bottom, and a third puddled upon the second bottom simultaneously; so that the whole operation proceeds continuously, and in rapid succession, without interference or interruption."

If the above process be what it is here asserted, it must revolutionize the manufacture of iron, and go far towards emancipating the United States from their present colonial dependence on England.

Glass-making.—The editor of the Plattsburg Whig, after a visit to the Redford Works, about 21 miles from that place, furnishes his readers with the following description of the process of making crown window-glass :—

The materials composing glass—consisting chiefly of sand, (powdered from burned sandstone,) mixed with lime and pearlash, with the addition, in small quantities, of some other ingredients—are thrown into large earthen pots, several of which stand in a huge furnace. These pots are made at the works, of the finest clay, imported from England and Germany. The furnace is kept at a high heat for about 40 hours, when the materials in the pots become

melted, and after taking away the dross, the metal is ready for the "gatherers." The end of an iron pipe, 8 or 10 feet long, is then thrust into the flowing metal, a quantity of which adheres to the pipe. After permitting this partially to cool upon the end of the pipe, it is again thrust in, a still larger quantity of the metal this time adhering.

Accumulations of the metal are thus obtained upon the pipe until the mass is sufficiently large to work into the proper shape. During this accumulation it is preserved in globular form by being kept constantly revolving. The men who do this part of the work are called "gatherers." The pipe with the globe of metal upon the end is then delivered to the "blower," who by blowing through the pipe and keeping it constantly revolving in his hand, forms a large vessel, somewhat resembling in shape a demijohn, the neck of which adheres to the pipe. After several minor operations, the end of an iron rod, of about the same length with the pipe, is fastened to the centre of the bottom of this immense demijohn, and the neck is broken off, leaving the vessel free from the pipe. It is now delivered to the "flasher." The open neck (the vessel still adhering to the end of the rod) is then held to the mouth of a furnace, until the metal of the neck and "shoulders" becomes quite soft. It is then exposed to a wider-mouthed furnace; and being kept constantly revolving, the centrifugal force compels the softened mass about the open neck to recede from the centre, gradually widening the mouth of the bottle-shaped mass until it flies into a thin wheel of glass, three feet or more in diameter, revolving with the rod as its axle. The wheel is then broken from the rod and placed in a kiln to "anneal," a process to render glass less brittle by exposing it to heat.

It is kept in the kiln a couple of days, when it is cut up into the various sizes of window-glass and packed for market. Four or five hundred of these wheels (we forget the technical name) are made at each time of "blowing," which is twice a week—on Mondays and Thursdays.

THE ABSORPTIVE POWER OF THE SOIL.

We find an article on this important subject in *The Farmers' Magazine*, which we copy, and commend to our readers. It deserves careful attention.

It may be remembered we several months ago alluded to the most important *discovery* made in agricultural science for the last century—the power of clay soils to absorb and retain the manurial elements of substances passing through them. We say it is a thorough discovery, and pregnant with greater results than all the rest put together of what have been called new in the science of farming. It was made by S. H. Thompson, Esq., and Professor Way, almost simultaneously; and the latter has now elaborated and further investigated this most important subject, and the results appear in the last number of the *Journal of the Royal Agricultural Society.*

It may be remembered his previous experiments showed, that when any substance containing ammonia, phosphoric acid, potash, or other similar materials, was passed through finely pounded clay, the most, if not all, of the substance was retained in the soil, and the water filtered through generally in combination with sulphuric acid and lime. He also discovered that the very filthiest sewerage, the dunghill drainage, and even the urine of the stable, became not only deodorized, but absolutely tasteless when it had passed through the pounded clay. Nay, more; he found that mere mixture pro-

duced the same effect, and that the clay seemed rather to lose the effect of detaining the manure by incineration, and that sand did not possess the property in any appreciable degree.

But what was the *cause?* Was it chemical or mechanical, or both? Professor Way instituted a series of very ingenious and satisfactory experiments to decide the question, and seems to have settled the difficult, abstruse point, almost to demonstration. His first attempt was to determine if this absorbing or detaining power was due to the little known but most potent class of silicates. He first tried the silicate of lime, as the most likely to be present in soils of this class, but found that substance incapable of detaining the ammonia.

He then imagined that the compound silicates might have this wonderful power, derived from the remains of granite rocks which were present in most of the clays, and fragments of which, especially of the feldspar, exist undecomposed in such soils. These he finely pounded, and digested with a solution of sal ammoniac; but they formed in them no power whatever to absorb the ammonia.

He next conceived that artificially formed double silicates might have an absorbing power, while naturally formed ones had not, on the principle of all recently formed combinations being more or less fickle, especially when in a highly divided state; and hence he compounded a double silicate, of silicate of alum and silicate of soda, and a substance resembling natural albite was obtained. We will not follow his process of manipulation and combination. It may suffice to say that this combination, when digested with ammonia and washed, contained a considerable quantity of that substance. The composition of the substance he gives is under:

Silica, - - - - - -	52·41 parts.
Alumina, - - - - -	29·68 "
Soda, - - - - - -	17·91 "

This he describes as a substance very slightly soluble in water, not more than three and one third grains being dissolved in a gallon of water.

But more: he found a similar double silicate of lime, where the latter substance nearly occupied the place of the soda. Similar experiments were made to form double silicate with ammonia, with potash, and with magnesia, and which were found to replace each other without any apparent injury to the effects of the material.

Nay, more; he found that with silicate of alumina and any of the bases we have before mentioned, the base will be dislodged by any of the other salts in the list, only in the following order:

Soda, Potash, Lime,
Magnesia, Ammonia.

Thus, he says, nitrate of potash will turn out soda from its silicate, and a potash silicate will be formed, whilst ammonia will replace any of the other bases.

Hence we find it to be wisely ordered that the very substance so very necessary and valuable, is just the one which will replace any of the other materials which seem to occupy a slighter place in their usefulness as manures.

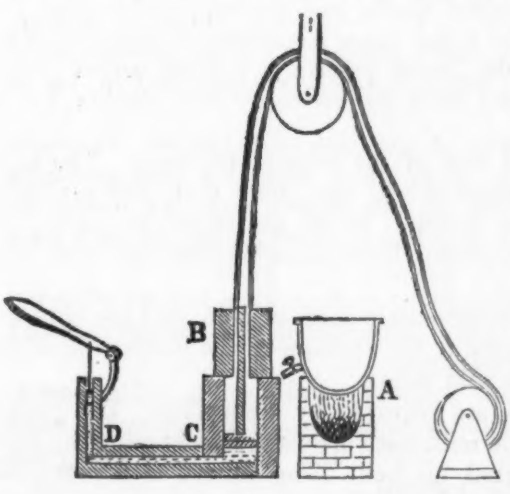
The Professor goes on to say that it is possible some day to manufacture his ready-made manure-holder at a reasonable cost, and so to give us far greater power over the fertility of soils. With his practical deductions as to growing wheat for a great number of years in succession by the appliances of the chemist—with these we must say we have less sympathy.

THE MANUFACTURE OF LEAD PIPE.

LEAD is one of the metals most anciently known, being mentioned in the books of Moses. It has a gray-blue color, with a bright metallic lustre when newly cut, but it soon becomes tarnished by exposure to the air. Its texture is close, without perceptible cleavage or structure, and the specific gravity of common lead is 11.352; but of the pure metal, from 11.38 to 11.44. Its ores number some nine or ten specific kinds more or less interesting to the arts. The uses of lead are very numerous: its oxides are chiefly employed as paints, while the metal is used in roofing, gutters, cisterns, and pipes. For these purposes it has many advantages. It is soft and malleable, so that two edges may be folded over and hammered water-tight without soldering; this prevents rupture from expansion, which often occurs in soldered vessels. Our supplies of this useful metal come mostly from the lead mines of Missouri, Pennsylvania, and Virginia, and it is dug out almost pure.

The most important article manufactured from this metal is pipe or tubing. There have been many modes of producing it. The original method appears to have been the wrapping of a strip of sheet lead, with parallel sides, round a cylinder, so as to make their edges meet, and then unite them with solder. Afterwards it came to be cast in a mould, in lengths of a foot each, which were then soldered together. Both methods have long been discarded as tedious and imperfect, and a machine invented to cast piping in one smooth, long piece, with rapidity, which we now describe.

In our wood-cut, A represents the furnace and melting-pot, from which the liquid runs through the faucet into the cylinder C, by raising the pipe-mould B. In the cylinder is a thick iron piston, moving up and down, water-tight with a piston-rod running up through the mould. Now suppose the piston to be at the bottom of the cylinder; and lifting up the mould B, let the melted lead run in from the melting-pot A, until the cylinder is full. Then let the mould be closed tight, and, after leaving the lead till it is nearly cold, by moving the piston slowly upward, it is forced up through the aperture in the mould. Those who have noticed melted lead in a spoon, know that it cools very soon, and will perceive that the lead is formed into a tube by being forced up around the piston-rod in the mould; and, as it is cold before it reaches the top, it does not run together again, but retains its tubular form. Being pushed up by the lead still remaining, it may be carried over the wheel above, and wound upon the large wheel. Other pistons and moulds are used, according to the size of pipe required. The lead is pushed up this piston by water-power; for the bent pipe D, with the pump-handle, is filled with water, and forms an *hydraulic press*, which is the most philosophical part of the machine.



THE TEETH OF THE HORSE, AND HIS AGE.

Dr. Slade is lecturing in Boston upon the anatomy of the horse. The fourth lecture was upon the subject above cited. We cut the following report of his remarks from that excellent paper, the *Boston Traveller:*

In opening, the lecturer remarked, that the belief that the age of a horse is shown by his teeth, is of very ancient origin. The development of these organs is very regular, but yet the appearances they present at different periods are not a sure criterion by which to judge of age. It is sure enough, however, to answer all practical purposes. It can hardly be said that the horse carries about in his mouth a certificate of birth, and yet so regular are the changes which take place at stated times in the mouth of the horse, that experienced observers have no difficulty in approximating with considerable certainty to the age of the animal.

The lecturer then dwelt at length on the anatomy of the teeth of the horse, which are forty in number. These teeth are set in the jaw in separate cavities, divided by a bony substance; these cavities change their form with age, and when a tooth is lost, become entirely filled up.

Of the forty teeth, twelve are incisors, twenty-four are molars, and four are tuscors.

The nippers are classed in pairs, being cut in that manner. The wolf teeth are just anterior to the grinders, have very small fangs, and are shed with the first molars.

The teeth are composed of three ingredients, the crusta pretosa, or hard crust, which is sometimes supposed to be tartar; the enamel, of pearly color, and very brittle; the ivory, forming the main body of the tooth.

In the nippers are cavities protected by the crusta pretora, which continues into them. These cavities are called marks, and are supposed to show the age of the horse. They cannot be relied upon accurately, however, as they, in some horses, become filled by the crusta pretora at a much earlier period than in others. In the temporary teeth the marks are very shallow, but in permanent teeth much larger.

Nature provides for the gradual wear of the teeth of the horse. The teeth grow until the animal is seven years of age, and after that they gradually project farther and farther into the mouth. In an old horse the marks are much more shallow than in the young horse, showing that the teeth have projected.

The tuscors exist only in the rudimentary form in man, and are often not found at all. They are chiefly useful to the stallions in the combats in which they often engage, especially in a wild state.

The milk, or temporary teeth, are removed by absorption. The permanent molars are fully cut before the milk teeth are shed, thus keeping the horse supplied with instruments to grind his food. The mouth of a young colt resembles very much in form a parrot's mouth.

The horse has two sets of teeth, the temporary or milk teeth, and the permanent teeth. The milk teeth are twenty-four in number, twelve incisors and twelve molars.

It is highly important, in judging of the age of the horse, to be able to distinguish between the milk and the permanent teeth. The milk teeth are white, the crowns are short and broad, the neck is well developed, and the roots are short. The outer surface is covered with channels, giving the teeth a fluted appearance.

The permanent teeth are large, the enamel is only partially exposed, and there is no fluted appearance, but one or two broad grooves run the length of the crown; the table is also broader.

To determine the age of the horse, the French divide his life into seven periods. The first is from birth to ten months of age, and is characterized by the appearance of the milk incisors, the two middle making their appearance during the first ten days after birth, and being very large in comparison to the size of the animal. The other incisors appear at gradual periods during the first division. During this division, also, three milk grinders appear.

The second period is from ten months to two and a half years. At one year of age all the incisors have appeared and are well up, but no wear can be discovered. The first permanent molar makes its appearance at the age of one year. At eighteen months of age the second permanent molar appears, and the horse has then five molars. At two years of age some signs of wear appear.

The third period extends from two and a half years to five years. At two and a half years of age the permanent incisors make their appearance in pairs, and the teeth become firmly set. At three years of age, the two middle permanent incisors make their appearance, and are readily distinguished from the milk teeth by their form, size and color, being darker and larger. The two first milk molars are shed, and their places are supplied by two permanent molars. We have then four permanent and one milk grinder. At four years of age, two lateral incisors appear, and there are then four permanent incisors in each jaw. The third milk molar is shed, and six permanent molars are found in the head. These six molars are the distinguishing characteristics of the four-year-old horse. At four years and a half, the two corner milk incisors are lost, and until the horse is five years of age, no corner teeth are visible. At this latter age, however, two permanent teeth supply the gap.

The fourth period extends from five to eight years of age, and is characterized by a full set of permanent molars and incisors. The mouth appears of a semicircular form; as age comes on, this form is lost, and the jaws grow flattened. The tuscors appear between the age of three and five years, but are irregular and cannot be depended on. The incisors gradually become worn, the middle tooth first showing the wear, and then the next anterior, and then the corner, precisely in the order in which they are cut. At six years of age the corner incisors are on a level with the others.

The tusks are usually well up at five years, and always at six years of age. A seven-year horse may be distinguished by the corner tooth in the upper jaw, which is worn so as to attract attention, there being quite an indentation. At eight years of age the horse has a perfect and mature mouth, which has every appearance of being finished, all the teeth being of a strong and permanent character.

After that age, the English say that no reliance can be placed on these signs to decide the age of a horse. The French, however, go farther, and say they can judge until the animal is twenty years of age. Conjectures may be made, but probably nothing permanent can be known.

The fifth period extends from eight to twelve years, and is distinguished by the appearance of the form of the tables of the teeth.

The sixth period extends from thirteen years to sixteen years, and is distinguished by the triangular form of the incisors. A sixteen-year horse may be known by the projection of his tongue and the large quantity of saliva

which runs easily from his mouth. The incisors also assume a horizontal position.

The seventh period extends from the sixteenth year to death, and is characterized by the flattened appearance of the teeth, and the projection of the upper jaw over the lower, so as almost to hide the lower incisors. Great study and attention is necessary, in order to be able to distinguish the age of the horse.

There are many tricks resorted to by horse-dealers to deceive purchasers with regard to the age of animals. In Europe the milk teeth are often extracted with a view of hastening the growth of the permanent set. This process, however, is a dangerous one, as the milk teeth are often broken off in the operation, and the growth is then much retarded.

It is also an artifice sometimes employed to mark the teeth with a hot iron. This deceit, however, is easily detected. The lecturer narrated an instance of a man who paid a high price for what he supposed to be a five-year-old horse. The animal was actually twenty years of age, but the man could not be convinced, as he could point out the five-year-old marks. The marks, however, were those of a hot iron. The teeth are also sometimes filed down, to prevent persons from discovering their projection in age.

A horse's teeth should never condemn him, for appearances are often deceitful; and if the animal is sound, has firm limbs, and exhibits no signs of too early, too long or too great exertion, he may safely be purchased, whatever the appearance of his teeth.

FORMATION OF THE COMPOST-HEAP.

A WRITER in the *American Farmer* gives the following directions:

"To every 2 loads of the rough materials, add 1 of stable or barn-yard manure; and for every 20 loads, add 1 bushel of plaster, 2 bushels of salt, and 5 bushels of ashes. Incorporate the whole together, layer and layer about: let the upper layer be of the rough matters, and pat the whole well together with the back of a shovel, and you cannot fail, at the end of a few weeks, of having a body of the most enriching, nutritive manure, fully equal to the best barn-yard and stable manure in the promptness of its action, and infinitely more lasting in its effects. In applying the soap-suds, urine, pot-liquor, and household slops, open several holes throughout the compost-heaps; mix a little plaster with the liquors before pouring them on; having done so, fill up the holes, and pat down the earth. Such compost-heaps should be examined every 10 or 14 days, and if found *hot*, should be shovelled over, and have the earth compressed with the back of the shovel again. Twenty double horse-loads of compost made thus will be sufficient to manure an acre of ground so as to put it in a state to bring from 20 to 30 bushels of wheat, and bear two crops of clover, while the ground, at the end of the time, will be in a highly improved condition; or to bring from 30 to 50 bushels of corn to the acre, provided the season be favorable, and the corn be properly cultivated, and to carry the soil through whatever may be the usual rotation. The labor of preparing manure in this way would be costly in the beginning, but would be sure to bring rich reward in the end, as it would secure good crops, increase the absorbent and retentive powers of the soil, and, as a consequence, make the manure more durable, while it would leave the land in a highly meliorated

state at the end of the rotation—provided your wheat crop was seeded to clover and grass. We prefer clover and orchard-grass to clover alone; for while the orchard-grass does not interfere with the meliorating effects of the clover, the admixture of the two makes a heavier crop, better hay, and relieves the cattle from all danger of being hovened while feeding on the pastures.

THE PATENT PREMIUM APPLE PEELER.

THE accompanying engravings represent a very ingenious and useful machine for peeling, coring and quartering apples, owned by N. E. Smith and R. W. Fenwick, of New-York city, to whom the entire patent has been sold and transferred by W. H. Lazelle, the inventor. It was patented on the 25th of January, 1853, and a silver medal was awarded to the inventor at the last Fair of the American Institute for it; it being pronounced by the managers and competent judges the best machine ever before seen for the purposes intended. It works on the right principle, and performs its work with astonishing precision, the peeling which is taken off from the apple not being thicker than a wafer. The core is removed with great facility, and the apple is sliced perfectly, and all is done in less than one fourth the time required by hand.

FIG. 1.

Fig. 1 is a perspective view of the machine; this view shows the machine

as prepared for operation. An apple is on the fork, partly pared, and others shown pared, cored, and quartered.

Fig. 2.

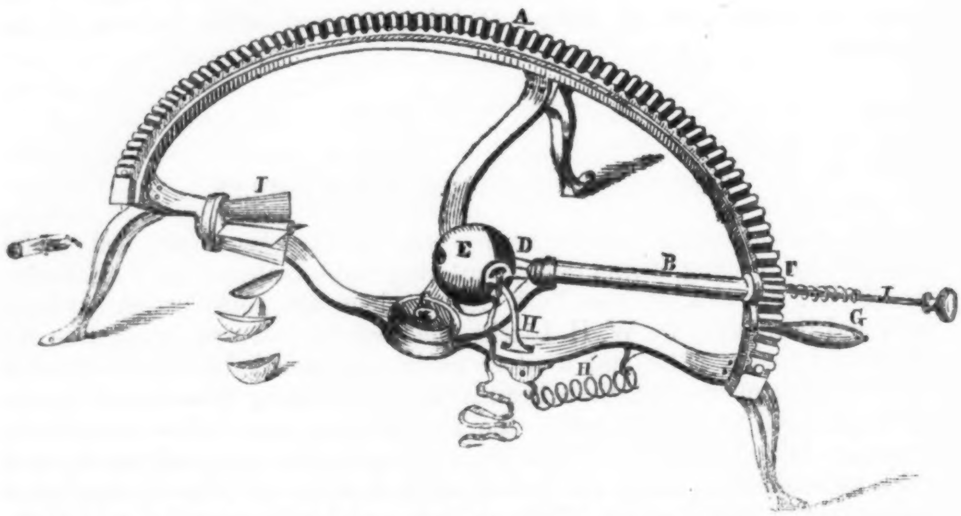


Fig. 2 is also a perspective view of the machine on a larger scale, showing the same more clearly.

The principal novelty of this machine consists in giving two motions to the fork, one in the path of a horizontal circle, and the other describing vertical circles; or one feeding the apple when on the fork towards the knife, or gradually changing its position from its blossom to its stem end, and the other causing it to be brought vertically against the cutting edge of the knife, and to be pared; whereby a stationary yet yielding knife can be employed, and consequently the great wear and tension on the spring of the same avoided.

To get up two motions on the fork, a semicircular rack, A, is employed, mounted on legs, and a hollow traversing lever, B, which turns on an axis, C, and is moved horizontally back and forth round the circular rack, A, by means of the handle, G, and pinion, E, which pinion gears into the teeth of the rack, A; the pinion, F, being fixed on the outer end of a hollow spindle, which turns freely inside the hollow lever, B, and has at its other end a flanged fork, D, on which the fruit, E, is placed to be pared, as seen in the drawing. H is a stationary, yet swinging knife, which is kept in contact with the apple by the spring, H. To pare the apple, the lever is moved from left to right, as shown in Fig. 2. As the lever is thus moved, the prongs of the fork, and also the apple, will traverse a semicircle; and the knife, H, will act longitudinally from the blossom to the stem end of the apple. When the pinion, E, is made to traverse the rack, the spindle fork revolves with a rapid motion against the knife, H; and thus it will be seen that the apple and fork have two motions, one in the path of a horizontal circle, and the other describing vertical circles. The swinging knife, H, being allowed to yield, and yet being firm and flexible, by means of the spring, H, it is rendered efficient, and accommodates itself to apples of different sizes and unequal surfaces; and also obviates the great wear and tension that is necessarily exerted in the old machines on the spring. The apple being pared, and the handle drawn to the extremity of the rack, the machine is in position ready for coring and quartering. The apparatus for performing these operations con-

sists of a coring rod, J, which passes through the fork, E, having a button at its outer, and a collar on its inner end; in which latter is a single prong, that serves for holding the apple while being pared, and for knocking it off after being pared, in order to be cored and quartered. For effecting the last-named objects, the corer rod, J, with the apple on it, is forced with the hand against the cutter, I, which consists of a hollow tube for cutting out the core, and four knives for slicing the apple. After the apple has been cored and quartered, the coring rod, J, returns to the position shown in the drawing, by means of the spring, J, on the outer end, between the button and the pinion, F. The said spring is compressed as the rod, with the apple on it, is forced against the cutter, I; and resuming its former position when the hand is withdrawn, the apple and core fall into different receivers.

Among the advantages presented by this machine, is the use of a traversing lever or handle instead of a crank, by which it has a horizontal instead of a rotary motion. Nearly all the parts of this machine are cast, and can all be made as strong as desired, and not one of them is liable to get out of order. It is a machine which will endure for a number of years without requiring to be repaired.

Applications for State rights to make and sell these machines, and for machines, must be made to the sole proprietors, N. E. Smith and R. W. Fenwick, 14 Vandam street, New-York, who will grant such rights at reasonable prices.

THRESHING IN GREECE.

A CORRESPONDENT of the *New-York Journal of Commerce*, writing from Athens, thus describes the operation of threshing and cleaning wheat in Greece:

"Harvest in Greece is a very interesting season. From all the neighborhood, perhaps for miles, the wheat is brought on carts, or, if that is not possible, on the backs of asses or horses, to the public threshing-floors. These are generally large circles, each perhaps fifty feet in diameter, and paved with common rough stones. Hither for weeks the golden grain is collected, until there are great piles of sheaves, sufficient to keep the threshers well occupied. Then the grain is evenly distributed over the entire surface of the threshing-floor, so as to be several inches deep. The operation of treading out the grain is performed by five or six men with as many horses. To every horse is attached a sort of drag with iron teeth on the under side, and upon this the driver rides, holding in his hands a rope and a stick to drive the horse with. The whole number ride abreast; and as they whirl rapidly around the floor, the outer horses run of course much more rapidly than the inner ones, producing a scene animating both to those engaged in it and the spectators. Considerable skill, too, seems requisite in order to avoid coming in contact the one with the other, and on such occasions much merriment is caused. When this is over, there comes the removing of the straw with great wooden pitch-forks, which much resemble forks on a large scale; and the winnowing takes place with large shovels of wood.

Should you pass by the threshing-floor near dusk, you would find the wheat which was not yet thoroughly cleaned from the chaff, ready to be taken away by the respective owners, heaped together in long and low heaps, and *sealed!* What would you imagine this to be for? In order that the owner might not come stealthily by night, and take away any part of it without paying the

tenth part to the government. The sealing is done by means of a board a foot or more long, with some letters cut in it; and this is impressed on the grain on all parts of the surface at short intervals of a few inches. Thus none can take away any part without disturbing the surface. The owner, of course, must watch his grain by night, lest any stray cattle should trample it, and destroy the impression, for this would create difficulty on the morrow. I have myself, when approaching the floors late in the afternoon, heard the men call out to me to warn me to be careful. The custom of sealing the wheat is said to be a Turkish one, and you may readily imagine how oppressive this mode of taxation must be to the farmer in Greece."

THE PORK TRADE OF THE WEST.

Messrs. Editors:—I send you a few of the statistics of the pork trade for the years 1851 and 1852, in the territory which was formerly Putnam county, Ill., now constituting the counties of Marshal, Stark, Bureau, and Putnam. This territory is 42 by 43 miles, being nearly square. At least two thirds of this trade within this territory is done in Lacon, the county-seat of Marshal county, by the firm of William Fisher & Co. Their packing-house is built on the bank of the Illinois river; it is one hundred feet square, and three stories high; the first, or basement story, is nine feet high, the walls of stone laid in cement, the floor, of course, gravel and cement. This room, one hundred feet square, is used for curing hams and shoulders, and also for storage; the second story is used for receiving and packing, also for trying out the lard. The house being built on the side of the bank, this story is very accessible, the floor being about on a level with the top of the wagon-box on three sides of the building. The third story is used for storing grain, and is capable of holding seventy thousand bushels. Two elevators are connected with this department.

The Messrs. Fisher purchased, in the year ending 1st of March, 1851, 10,529 hogs, whose average weight was 212 pounds. Total, 2,232,148. Average cost, \$3 20½ per hundred. Total cost, \$71,651 94. For the year ending 1st of March, 1852, they purchased 10,244 hogs, averaging 246 pounds each. Total weight, 2,520,024 pounds. Average cost, \$4 03 per head. Total, \$101,556 96. Now, if the position I have assumed is correct, that the Messrs. Fisher pack two thirds of the hogs, the amount for the year 1851 and 1852 will stand thus:

Year ending March 1st, 1851:—	
Total hogs, - - - - - - - - -	14,039
Total weight, averaging 212 lbs. per hog, - -	2,979,530
Total cost, at \$3 20½ per cwt., - - - - -	\$95,535 92
Year ending March 1st, 1852:—	
Total hogs, - - - - - - - - -	13,659
Total weight, averaging 246 lbs. per hog, - -	3,360,032
Total cost, at \$4 03 per cwt., - - - - -	\$135,409,028

These hogs are gathered from a region of country of which not more than one acre in ten is enclosed.

But little was done in fattening pork prior to 1840, and since that period, more corn has been shipped off than has been used to fatten the pork sold. Pork is now selling at \$6 per hundred, but most of the hogs have been

bought at $5 per hundred for all over one thousand. Considerable attention has been paid in selecting good hogs for fattening. We have hogs from the following breeds at this time: Irish grazer, Berkshire, Yorkshire, Bedford, Suffolk, Norfolk, and China. They are generally fattened in pens on the ground, without much if any shelter, and fed with corn in the ear, with water. Frequently the pens are made near some creek or standing water, where the hogs help themselves. In stormy weather these pens of hogs show every thing but comfort and economy. It is not much to be wondered at that the merciful man prefers to sell his corn rather than to feed it in that manner. I have found the following a good plan for a new country, (that is, a prairie one:) during the months of September and October I put my hogs into a field of corn, say from two to ten acres, in proportion to the number of hogs; generally they will not pull down more corn than they need at the time. I have found that they have gathered it as clean as hands generally do it. And they will make good beds for themselves to sleep in. The months of November and December, I put them in my stack-yard, which is near my barn, and have thus far principally fed with corn in the ear. My hogs find good quarters around my stacks, and if well-tended will want but little hay, and scarcely any grain, and fatten fast. Yours, truly, RALPH WARE.

Granville, Putnam Co., Ill., Dec. 17, 1852.

STRAW AS A COVERING.

THE following, although intended as applicable to forcing culture for garden use, may be read, says Prof. Mapes, in a more extended sense. Where sedge, salt grass, straw, and other cheap materials can be readily procured for the covering of the earth as a mulch between many crops, is a judicious practice. Cauliflower, and many others of the *Brassica* tribe, refuse to perfect themselves during the hot summer months, and a slight coating of the soil between many plants, often insures a crop while other means fail.

We would refer our readers to articles on Mulching, volumes 1, 2 and 3, for further information on this subject.

Clean straw is an excellent covering for many things; thousands on thousands of sea-kale in frames or under hoops have no other blanching material; and how clean they grow in it! Rhubarb, in winter forcing and early spring, grows beautifully pinky. It is well known that early spring frosts destroy rhubarb; but if a six-inch layer of straw is put on every crown, as the heads put up, they raise the straw with them, and it not only gives the stalk a better color, and makes them less "stringy," but it keeps the leaves from growing oo large. No wind will blow it off, nor will the most intense frost injure the plants. Straw should not be put on as a mere litter; it is as good as a frame upon a large scale. What sort of eatable strawberries would we have without straw? In summer, every crop, such as gooseberries, currants, and many other things, should have the protection of straw, which keeps the sun from drying up the surface, and the surface roots damp and cool, while all weeds are kept down. Market gardeners use it for their frames: it matters not whether for cucumbers, melons or potatoes, straw is their covering; and their crops are more secure than when protected by a thin mat. But some may object to the use of straw, on account of the litter it makes in a garden; but if any of those who object to its use for this reason will just take a peep at Covent

Garden market at any season, they cannot fail to be struck with the quality of the produce in the raising of which straw plays an important part. Straw is also the best of all manures for a strong retentive soil, when it is dug in fresh, as it decays and leaves innumerable worm-like holes, which act as drains for the roots.—*Gardener's Chronicle.*

We have tested the value of this suggestion by covering the earth around various plants with the fresh grass mowed from the yard. The effect has been remarkable. Grass thus used is of much more value than if converted into hay. Many, however, have a small grass-plot adjoining their gardens, the growth of which is annually thrown away. They would find it much to their advantage to mow carefully and often, and use the product as a top-dressing in the garden. Cabbages treated in this way during this dry season required no cultivation for many weeks, and grew much more rapidly than others of the same bed which were uncovered, and cultivated carefully with the hoe three and four times a week.—*Family Visitor.*

COWS AND OXEN IN PORTUGAL.

The following letter of Prof. Haddock will be read with interest. It is published in the *Granite Farmer.*—Eds.

Oxen, strange as it seems, are almost exclusively employed in agriculture; nor do they appear to feel the heat much. Indeed, the Portuguese have a kind of Hindoo respect for the bovine race, and always treat them well. I never, in any country, saw oxen and cows so universally fat and healthy in appearance. During the winter, though there was not a single frost, the cows driven into the street in which I live, and milked there, every morning, at the doors of their customers, were generally covered with a warm woollen blanket. Oxen are often protected from rain and flies by an oil-cloth, covering them from the hips. I every day see a beautiful ox belonging to the Duke Palmella, and used to draw water in a hogshead upon wheels, covered entirely with a canvas awning raised, in an arch, over the shaft of his cart. Like the snail, the happy fellow carries his house with him. And both oxen and cows are so trained, it is curious to see them. The cow is as tame, as easily handled, as quiet, whilst women or children are playing with its horns, as a pet dog. The calf is driven to town with its mother, and learns to go through all the operations which are to be the future business of its humble life, whilst it is thus, with its nose muzzled, following the herd of milch kine. It is called and sent off at will with a word. Oxen are driven by a man who goes *before* them, and sometimes between their horns even; he turns his face to them, and brads them with his long goad-stick in the side or the flanks; or he takes hold of a rope which unites their horns, and leads them as we lead a horse. These animals are the peasants' pride, and are often decked with ribbons and bells. I saw, at the October Fair, at "Campo Grande," near Lisbon, more than a thousand yoke, many of them splendid animals, and all gaudily ornamented, and driven by men as gaily attired as themselves.

The yoke, what an instrument that is! and the cart and the plough—these man makes; God makes the oxen. The yoke is a straight piece of chestnut wood, about four inches by two and a half, slightly hollowed where it lies upon the neck; it has two straight pins, a foot long, running from it

at right angles, where is put the bow, and united under the animal's neck by a bit of rope, or thong of green hide. This rude implement is confined to the tongue of the cart with ropes, and to the horns with thongs. Unyoking is untying the strips which unite the pins under the neck, and those upon the horns. And as the tongue of the cart is fastened to the body, tipping up carries up tongue and yoke together, and leaves the oxen all ungeared below.

The cart has *solid* wheels, about three feet high, and from four to six inches thick, with a fixed axle, that turns, of course, with the wheel. The body and tongue are framed together, and confined to the axle by pins, between which it revolves with a noise, frequently, that may be heard for a mile. Now and then the axle is oiled, but not generally; the "*stridentia plaustra*" of Virgil is recalled to you upon every public road. The plough is even *ante-Roman;* ruder than Virgil describes. The beam extends to the yoke, and is fastened to it with cords. The same stick serves for share, coulter, and handle, and is morticed to the beam at not quite a right angle. It is generally pointed with iron. The harrow and hoe are similarly rude.

And yet with such instruments the fields are made to yield abundantly. Beautiful crops of barley, wheat, Indian corn and potatoes cover them on every side. Saving of labor seems hardly an object. Men work for fifteen cents a day and find themselves. I must be more particular on some future occasion.

MODE OF PLANTING AND CULTIVATING COTTON.

Messrs. Editors:—Below I will give you the product of six acres of poor, sandy ridge land, this year—my mode of planting and cultivating, which I follow altogether. I have now picked 7319 pounds, and have, I think, (and it is the opinion of others,) open and growing bolls enough to make 1000 pounds more.

Mode of Planting.—The land was in cotton last year, without manure I ran a scooter furrow in the middle of the old rows, and deposited my manure, consisting of barn-yard manure, and a compost (put up last December) of leaves, scrapings of the earth, ashes and hen-house manure, alternately, at the rate of ten four-horse loads per acre. On this manure I throw a ridge with a twister or shovel, and let it lie until planting-time. I then finish the bed, and open for the reception of the seed with a very small scooter—drop the seed at the rate of a bushel and a half to two bushels to the acre—cover with two scooter furrows, and when the seed begins to sprout, I knock off with hand rakes.

Mode of Cultivating.—As soon as the cotton gets four leaves, I start all hands to chopping out to three and four stalks; when they have got start enough, I put some ploughers to running round with broad shovels, with a board on the side next to the cotton, and let it stand till the next ploughing, so that the sun can get to the roots. The second working, I hoe to one stalk from eight to twelve inches apart, and throw out the middles to the cotton with a shovel. Third working, I hoe and run round with a shovel, and let it stand two or three weeks, depending upon the weather. Fourth working, I scrape out the grass, if any, with the hoe, and throw out middles. Fifth working, I run round, and break out the middles at the same time with the sweep or

buzzard. This constitutes the workings of the crop. This year I only ploughed this six acres four times, in consequence of its locking so early.

I neglected to state in the proper place, that my rows were three feet wide. Had they been wider, I think I would have made more.—Yours, &c., A Ploughboy.—*Farmer and Planter.*

FOR THE PLOUGH, THE LOOM, AND THE ANVIL.

THE MINERALS OF LAMOILLE COUNTY, VERMONT, &c., CONCLUDED.

No. V.

I know not how far, in a communication of this nature, I should be allowed to conjecture on ancient appearances, that do not at this time admit of actual demonstration—but there are unmistakable monuments and evidences of the existence of a lake in days long gone by in this county, covering some 50 square miles; and I cannot forego my desire to give a brief description of it. It extended from Johnson to Wolcott, Stowe, Eden, and Hydepark. The elevated arenaceous plains, skirting the streams in those towns, are extensive and numerous. One in the east part of Hydepark, containing some 500 acres, covered with smoothed pebbles, many of them being of serpentine, and from Lowell 20 miles north. There is the bed of an ancient stream, ranging from north to south, to this large plain or *delta*. (I perceive no impropriety in naming those elevated alluvial plains *deltas*.)

There is satisfactory evidence to me, and others of more geological knowledge than myself, that the stream now called Green river discharged its waters through the above-named ancient channel into this lake, and formed this large plain; subsequently it wore a channel through mineral rocks to the east, and enters the Lamoille in Wolcott. There are a variety of pot-holes in and about the bed of the ancient stream, one about five feet deep, some hundred rods south of the present bed of the river, and more than 100 feet above it. There are pot-holes in various locations in the county, much elevated above the present terra firma, *sure* evidence the streams were once at a higher elevation than at present.

The plain on which Hydepark village and the county buildings are located, is some 200 feet above the Lamoille river, and contains about 75 acres; it has been penetrated to the depth of 63 feet in sinking a well; it is alluvial to that depth, and no water. The plain is nearly half a mile in extent: its slope towards the river is very abrupt. (*Vide* my description of the hydraulic ram.) From Johnson to Wolcott those arenaceous plains skirt the borders of the streams; some are level and very picturesque, shaded by the deep foliage of the sugar-maple; others broken by ravines, and washed out by the rains and small rivulets after the subsiding of the waters of the supposed lake. At the base of those *deltas*, large and numerous springs of the purest water gush out of the sand. The evidence of the gradual draining of the body of water in question is abundant and satisfactory.

The Lamoille river has cut or worn through both spurs of the Green Mountains, in Wolcott and Johnson, making a deep channel through the towering and in some places solid rocks.

At what is called the bridge falls in Johnson, the river when low rushes under a rocky arch, forming a safe passage over the stream. There is a pot-hole the size of a hogshead, 15 feet in depth, so near the edge of the precipice

that the down-river side is worn off, the bottom of which is full of water and is about 5 feet deep, and the water does not pour into it except in freshets.

Two miles lower down the stream, the water has worn a channel through the solid rocks; in low water a man may step from one side of the channel to the other.

Below this narrow channel, through which the water rushes with great violence in freshets, the river spreads out into a bay or eddy, and here are scattered a large number of fragments of the rocks from above, that would weigh several hundred tons; the ravine or gorge is very romantic.

The boulders of rocks that have been split from the mountains alone, probably by frost, or the water freezing in the crevices, and rolled down the gorge, are very interesting to the geologist.

Here appears to be the barrier of mural rocks which obstructed the flow of the waters, and gave origin to the lake; these, and other obstructions which might be named, are to me as satisfactory indications of the former existence of the lake I have described, as though I were endowed with second-sight.

I have been as brief as possible in the above short and not very systematic sketch, having written wholly from memory. I wish to be further understood, that all the knowledge I possess of geology has been obtained within the few past years in my own study, and observations in my excursions over the country, without the assistance of an instructor; I also possess 1000 geological specimens, open to the inspection of any one disposed to examine them.

ARIEL HUNTON.

Hydepark, Vt., February 24, 1853.

FOR THE PLOUGH, THE LOOM, AND THE ANVIL.

INFORMATION WANTED.

MESSRS. EDITORS:—Will you, or some of your correspondents, please point out the true difference between colic and bots in horses, and the *appropriate* remedies for each.

Also, the cause and cure for *gapes* in chickens. In reply to one of your correspondents respecting the best method of turning cream *sour* for churning, you say, "all the arrangements of the dairy are intended to guard most effectually against such a condition." Now, if you can explain to me how milk can be churned, and butter obtained, without the milk being *turned*, I shall feel under great obligations to you; for it will certainly be a "new thing under the sun," in this region of country at least, so far as I am acquainted.

I should also like to know the cause of grapes falling off just before they begin to ripen, in our climate, and the means by which it may be prevented.

INQUISITOR.

Nashville, Jan. 19, 1853.

WE will give to our friend a reply in which we have confidence, although the inquiries embrace topics on which there is great diversity of opinion and of practice. We also invite the opinions of others, especially if confirmed by specific cases.

COLIC in horses is the same disease as in our own species. It is an inflammation of the bowels, induced chiefly by indigestion, from being fed either too much or with improper food. The proper treatment consists in the

use of means calculated to equalize the circulation; namely, by external applications, producing *warmth* in the parts affected, and such internal remedies as tend to relieve the crowded vessels; to wit, grains of paradise, caraway, ginger, &c., and always given in a liquid form. An injection of soap-suds has also proved efficient in securing speedy relief.

BOTS are the larvæ of the gadfly; the insect deposits her eggs in the limbs and sides of the horse, and they are afterwards taken into his mouth and swallowed with the food. When hatched, the insect attaches itself to the inner coat of the stomach, or of the first intestine.

The symptoms differ from those of colic, those of the latter being more severe and painful. In the bots, loss of appetite, weakness, vertigo, &c., are among the symptoms. Hence tonics and stimulants would seem to be appropriate, especially in connection with nutritious food, and also nutritious injections. If the bots are abundant, they obstruct, more or less, the passage of the food, either into or out of the stomach, according to their location, and thus tend to produce the symptoms described. Bots are found, however, not unfrequently in horses who have not exhibited any indications of disease.

The following recipe has been found efficient in bringing them away: Poplar bark, snakehead and slippery elm, each 4 oz.; mandrake and wormseed, each 2 oz.; golden seal, 1 oz., all reduced to a powder. Divide into 16 doses, giving one each night and morning in the food.

Many internal diseases and derangements are attributed to the bots, for which they are not responsible.

Sour Cream for Butter.—We are aware that the "milk is generally turned" before the butter is obtained. Whether this is *essential*—that is, whether it is a necessary part of the process, or only an incident, the consequence of the means employed—is another question. We know of no solution of the chemistry or the philosophy of butter-making, which necessarily involves the change referred to. Butter is not the *result* of acidity nor of fermentation.

When a boy, we have often churned the cream, and learned at that age that sweetness was considered the best condition of the cream for securing good butter. The reason is obvious. It is an absolute impossibility to separate every particle of the caseine or of buttermilk from the new-made butter; and hence it is desirable not to have sour and rancid elements to begin with, as we shall have if this change is completed before churning. It may shorten the process of churning to have the cream sour, but this is useful rather in aiding the rapid collection of the butter after it has actually "come," than in any thing else. Such at least is our opinion. Professor Norton, we believe, has somewhere recommended that the cream should be allowed to assume the incipient stages of fermentation before it is churned; but we have never known that a condition of absolute sourness was desirable, and still less that it was essential.

We happen to find on our table the following statement from the *Country Gentleman*—very good authority—which we append:

"*Churning in Winter.*—Accurate experiments were made some years since by Professor Traill, of Scotland, which throw some light on winter churning, of which the following is a condensed statement—three quarts of milk being used in each experiment, the cream rising for 39 hours:

"Experiment 1.—*Cream, sweet,* with half a pint of cold water, churned 27 minutes, temperature rising from 62° to 70°, producing 1,386 grains of good butter. Experiment 2.—Cream and milk together, *sweet,* churned three hours, cold water occasionally added, no butter. Experiment 3.—Cream

kept two days, half a pint of cold water, churned 20 minutes, temperature rising from 54° to 63°, and producing 1,756 grains of good butter. Experiment 4.—Cream and milk, sour, kept two days, half a pint of cold water, churned 1 hour and 50 minutes, producing 1,968 grains of good but paler butter. Experiment 5.—Cream and milk, after standing 39 hours as usual, heated to 156°, and skimmed next day, produced 1,968 grains of good yellow butter."

For Gapes in Chickens.—One grain of calomel in a pill of bread, followed by flour of sulphur, with a little ginger, mingled in their food. Wash the mouth with weak solution of chloride of lime; keep the patient dry and warm, and apart from other fowls. Or, for internal remedies, give powdered gentian, ginger, one part each; epsom salts, one and a half part, and flour of sulphur, one half part; mix with butter, and give every morning.

CINNAMON FIELDS OF CEYLON.

OUR morning was, as usual on our first arrival, taken up by visits; in the afternoon we drove in Sir E. Barne's sociable through the far-famed cinnamon gardens, which covered upwards of 17,000 acres of land on the coast, the largest of which are near Colombo. The plant thrives best in a poor, sandy soil, in a damp atmosphere; it grows wild in the woods to the size of a large apple tree, but when cultivated, is never allowed to grow more than ten or twelve feet in height, each plant standing separate. The leaf is sometimes like that of the laurel in shape, but of a lighter color; when it first shoots out, it is red, and changes gradually to green. It is now out of blossom, but I am told the flower is white, and appears when in full blossom to cover the garden. After hearing so much of the spicy gales from this island, I was much disappointed at not being able to discover any scent, at least from the plants, in passing through the garden; there is a very fragrant-smelling flower growing under them, which at first led us into the belief that we smelt the cinnamon, but we were soon undeceived. On pulling off a leaf or twig, you perceive the spicy odor very strongly, but I was surprised to hear that the flower had little or none. As cinnamon forms the only considerable export of Ceylon, it is of course preserved with care: by the old Dutch law, the penalty for cutting a branch was no less than the loss of a hand; at present, a fine extirpates the offense. The neighborhood of Colombo is particularly favorable to its growth, being well sheltered, with a high, equable temperature; and as showers fall frequently, though a whole day's heavy rain is uncommon, the ground is never parched.—*Bishop Heber.*

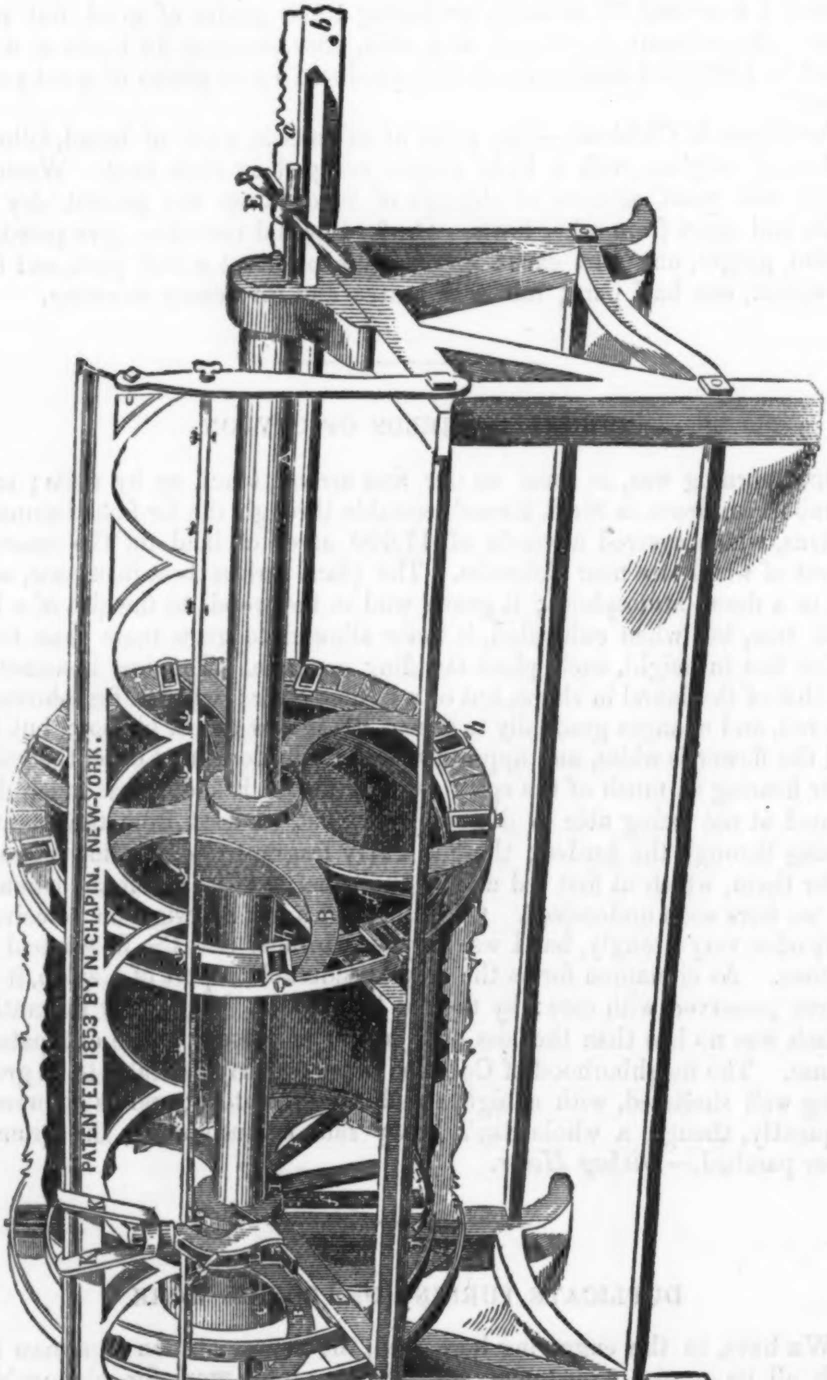
DUPLICATE TURNING OF PROFILE WORK.

WE have, in the engraving here seen, the representation of a new lathe, with all its proper adjustments for turning profile work for window-blinds, doors, gates, &c., invented by Mr. Nathan Chapin, of this city, for which a patent was granted in January last.

The machine consists of a frame-work, supporting a stationary shaft, on which two open discs revolve, which support the pieces of wood that are to be turned, and which form a revolving cylinder. A tool and pattern frame

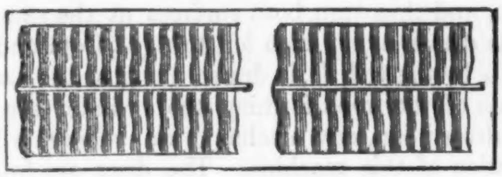
is also seen in the front of the machine, for turning the outside of the wood, and another for operating upon the inside is attached to a rod connected with the main shaft. Both surfaces are thus turned at the same time.

FIGURE 1.



In figure 1, one half of the wood which should comprise the cylinder is removed, in order to show the tool which cuts the inner surface.

A is a stationary shaft. On it are placed the open discs, B B, which have centre collars fitted around the shaft A, so as to revolve on the shaft; C is the driving pulley; it is secured to a collar of the disc, and rotates them on the stationary shaft. All the pieces of wood to be turned are placed between the two open discs, B B, like the staves of a barrel, and they are clamped up by screws, *h*, which draw the section rings, *e e*, close to the outer ring of the discs, and bind the pieces or slats of wood between them. When the two discs are fitted with the pieces of wood forming the cylinder, it is made to revolve by the pulley, C. To turn the faces of the wood the desired pattern, a gouge or tool for that purpose is made to act on the face of the wood by the guidance of a pattern; *n* is the stationary pattern on the outside frame in front of the rotating discs; K K are the arms of the tool or gouge, L. This tool is hung in a knuckle stirrup, and the upper part, K K, is made to slide along the track forming the bar of the upper part of the frame. The screw, O, the guide, is like that of a pentagraph. It runs along the pattern, *n*, as K K are moved by hand along the frame, and thus the pattern guides the tool, L, in and out, over its inequalities, so as to produce surfaces corresponding with the pattern.



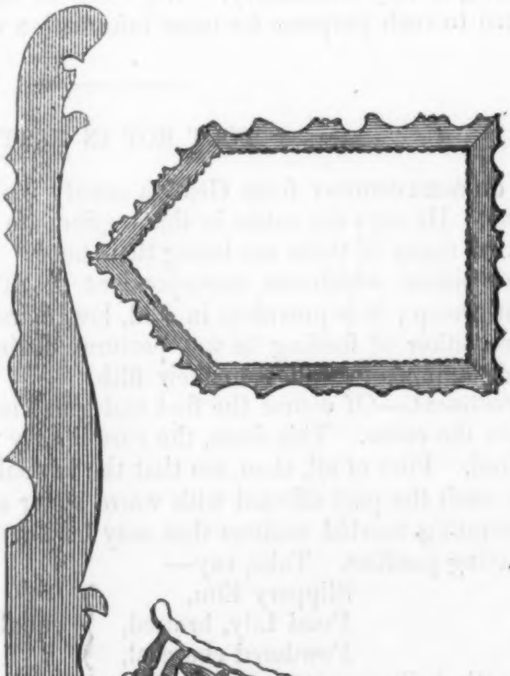


FIGURE 2.

The inside surfaces are acted upon as follows:—In the lower part of the shaft, A, there is a rod, D, extending the whole length in a recess for that purpose. This rod carries an arm, I, on its inner end; this arm carries the gouge, J, for acting on the inside. The rod, D, on its outer end, has a guide, E, which lies on the surface of the pattern, *a*. By an attendant drawing the guide, E, along on the

slide, *b*, the pattern, *a*, will so direct it by its inequalities, to vibrate the rod, D, and consequently the arm, I, and the gouge, J, so as to act upon the wood inside, and thus turn both surfaces at the same time. The tool for the outside is drawn along from left to right, from end to end, of the wood; and the tool, L, by the rod, D, is drawn along at the same time; thus both inside and outside of the wood forming the cylinder are turned at one operation. By this description, any mechanic, we believe, will be able to understand the operation of this machine. The discs are from six to eight feet in diameter. A man can enter through the open spaces to trim off any deficiencies inside. A saddle, G, for this purpose, is hung on the shaft; it is supported by arms, *ffff*. This machine does a great quantity of such work very rapidly, and produces it in a completely finished state.

It is now working successfully in this city, and its operation, we are informed, is very satisfactory. We refer to an advertisement on the page devoted to such purposes for more information respecting it.

FOOT ROT IN CATTLE.

A correspondent from Geauga county wishes to know how to cure this disease. He says the cattle in that region are suffering very much from it, and that many of them are losing their hoofs.

The disease which our correspondent describes is analogous to the "foot rot" in sheep; it is prevalent in cold, low, marshy countries, and is the consequence either of feeding in wet pastures during the winter months, or permitting animals to wallow in their filth.

Treatment.—Of course the first and great leading indication of cure is to remove the *cause*. This done, the cure is easy: indeed, it is often all that is required. First of all, then, see that the animal is removed to a dry situation. Then wash the part affected with warm water and soap, and for the purpose of liberating morbid matters that may be burrowing in the soft parts, apply a relaxing poultice. Take, say—

$$\left.\begin{array}{l}\text{Slippery Elm,}\\ \text{Pond Lily, bruised,}\\ \text{Powdered charcoal,}\end{array}\right\}\text{ equal parts.}$$

Mix with boiling water, and put the ingredients into a bag, and secure it above the fetlock. As soon as a free discharge of matter takes place, abandon the poultice, and if the discharge is offensive, wash the cleft, morning and evening, with salt water, or what is perhaps better, salt and vinegar.

If the animal's general health appears bad, give the following mixture at a dose, and occasionally repeat:

Flour of sulphur, half an ounce.
Powdered Sassafras bark, one ounce.
Burdock (any part of the plant), two oz.
Steep in a quart of boiling water, and when cool, strain.

A FLYING RAILROAD BRIDGE.

It has been proposed to build a railroad bridge over navigable waters, so as to have the passage open, except while the train is passing. Piers are built at proper distances, with rails on the top of each. A platform of suit-

able length is placed on these piers, resting on wheels, which is movable at pleasure. When a train is to pass, the locomotive or a stationary engine is to be used to propel it across the stream. This does not look so quixotic as some propositions, the success of which has been placed beyond controversy.

IRON—ITS NATURE, HISTORY, AND PRESENT STATE.

THE most precious of the metals, if we take actual value for the criterion, is undoubtedly iron. Unlike metals of inferior utility, its ores are not distributed in thin veins, or scattered in minute particles, but are thickly stratified over thousands of square miles, chiefly in the northern regions of the earth, where nature has been less profuse of her other benefits. Thus, it is plentiful in New-York, New-Jersey, Massachusetts, Pennsylvania, Connecticut, Missouri, Virginia, and Wisconsin. Indeed America excels all the world in the abundance, and even quality of its iron. Sweden produces in Europe the finest kind of iron, and in abundance. Great Britain ranks next, then Norway and Russia. Some specimens of native iron, nearly pure, have been found in Siberia and in South America; also many iron stones, rich in the metal, supposed to be of volcanic or meteoric origin, have been found in numerous parts of the earth; but all the iron of commerce is obtained by chemical means. When pure, it s a metal of a bluish-gray color, and a dull fibrous fracture. Its specific gravity is 7.78. It is the most tenacious of metals. It is singularly susceptible of the magnetic virtue, but in its pure state soon loses it. When rubbed it has a slight smell, and it imparts to the tongue a peculiar astringent taste, called chalybeate. In a moist atmosphere, iron speedily oxidizes, and becomes covered with a brown coating, called rust. There are nineteen different ores of iron: Native iron of three kinds, pure, metalliferous, and steely; arsenical iron, yellow sulphuret of iron, white sulphuret of iron, magnetic sulphuret of iron, black oxide, secular or scaly iron, hæmatite, yielding red powder, yellow hæmatite, pitchy iron ore, silico-calcareous iron or zenite, sparry carbonite and clay iron stone, phosphate of iron, sulphate of iron, native copperas, chromate of iron, arseniate of iron, chloride of iron, oxalate of iron, and titanate of iron. The hæmatite and the brown iron stone are the most important. The *native* iron occurs generally in veins, and is mostly pure. The meteoric iron contains nickel, and the mass is magnetic. Berzelius says that the magnetic oxide or magnetic iron ore is a mixture of protoxide and peroxide, and contains in 100 parts: iron, 71.74; oxygen, 28.26.

The use of this metal is of very great antiquity, though, on account of the difficulty of separating it from its ores, and of working it, probably not so remote as the employment of gold, silver, copper, and other comparatively soft metals, which are in many places found in a pure metallic state. The first worker in this metal is mentioned in Scripture as Tubal-Cain, while the Hellenic mythology refers its origin to Vulcan. Some writers assert that iron is mentioned by Moses, as the material of which knives and swords were fabricated, and that Herodotus mentions the presentation of a saucer or vase of iron, very curiously inlaid, by Alyattes, king of Lydia, to the Delphic oracle. Other writers maintain that the working and use of iron at these periods were utterly unknown. We are certainly left in perfect ignorance of the period of the origination or working of metals. Still, in the hoariest antiquity we find examples which prove the smelting of ores, the casting and the beating of

metals. In the earliest Egyptian civilization this is shown. An English author has shown that we have very satisfactory evidence that the progress of the arts and manufactures has been from the East towards the West, and also that the indications are clear that the commencement of civilization may be referred to the locality which is washed by the Persian Gulf and Indian seas on the south, and bounded by the line of perpetual snow on the mountain-chains of the north. He believes it very probable, that among the mountaineers of the mighty Himalayan ranges metallurgy had its origin. Of one thing we are certain, that to take that strong and most unlikely ore from the earth, from its long home in the deep mines and caverns, to kindle the roaring fire, and to compel its stubbornness thus to yield, until the most unpromisingly dull becomes fine in texture, and bright in polish—until the most blunt and edgeless becomes sharp and capable, was indeed a conquest worthy of the period when "there were giants in those days." Had the world possessed neither coal nor iron, civilization can no more be conceived than we can conceive life without air. Iron enters into every comfort and convenience of life, and exercises a major power over the persons and destinies of man and events. Without iron, the principal arts and manufactures would be unknown while the art of agriculture must have dwindled on in perpetual infancy.

A Robert Hunt ventures a not uninstructive speculation on the probable accident that would lead man to a knowledge of the value of metals. It is not unlike the opening chapter of Paley's Natural Theology. We must suppose man in a country abounding in mineral treasures—almost in fact spread out on the face of the native rock. It is well known that in the porphyritic mountains in the midst of the Arabian deserts, and those which formed the elevated foundations of the Persian magi, immense quantities of the peroxide of iron and the ores of copper are found. In the *debris* of the valleys which are spread out at the base of these mountains, gold is found largely disseminated. In the fissures of the rocks metallic veins would abundantly exist; and since we find man sheltering himself in caves from the weather's inclemencies, they could not fail to have attracted his attention. In the remotest of days, fire was a well-known element; nature instructing as to its use and power. Volcanoes belching forth their flames and smoke, bursting with the energy of heat, and deluging the plains with rivers of glowing molten matter, soon told those who surveyed these grand phenomena, that an agent existed which would, if tamed and brought within human control, be a most important ameliorator of human necessities. The Grecian myth of Prometheus stealing fire from heaven, undoubtedly pointed to the first bold man that attempted the subjugation of this consuming power. Observation would tell the intellectual savage that fire would melt the rock, and the application of it to the veins of the caverns, the iron sands of the hills, and the gold of the ravines, would make him acquainted with the easy fusibility of the ores of the metals, compared with that of the earthy mineral constituting the rock in which they were found. The earliest examples of metal work are evidently castings, and the Chinese possess specimens which are proved, beyond all dispute, to have been made at a very early period. Bunsen assures us that the historical evidence and regular chronology of the Chinese go back 2,500 years before our era, and in the twelfth century before Christ. Ths-cheuti records the measurement of the length of the solstitial shadow, taken with such exactness, that Laplace found that it accorded perfectly with the theory of the alteration of the obliquity of the ecliptic. This shows an acquaintance with the exacter sciences, which, according to the ordinary progress of mental operations, it required long, long ages to produce.

We should not undervalue the intellectual qualifications of those races whose names are lost, though the remains of their industry remain. The builders of the pyramids, who lived nearly 4,000 years before the Christian era, must have had a vast amount of mechanical and architectural science. Indeed, proofs are not wanting to show that in many industrial arts, the men of the year 1853 are immeasurably in advance of those who lived 4,000 years before Christ. In a future article we will embrace the history of iron down to its present use.

EFFECTS OF DRAINAGE ON THE TEMPERATURE OF THE SOIL.

All the rain that falls upon our fields must either be carried away by natural or artificial drainage, or, having thoroughly saturated the soil on which it falls, be left upon the surface to be carried off by evaporation. Now, every gallon of water thus carried off by evaporation requires as much heat as would raise five and a half gallons from the freezing to the boiling-point! Without going to extreme cases, the great effects of the heat thus lost upon vegetation cannot fail to be striking, and I have frequently found the soil of a field well drained higher in temperature from 10 to 15 degrees than that of another field which had not been drained, though in every other respect the soils were similar. I have observed the effects of this on the growing crop, and I have seen not only a much inferior crop on the undrained field, but that crop harvested fully three weeks after the other; and owing to this circumstance and the setting in of unsettled weather, I have seen that crop deteriorated fully 10 per cent. in value.—*B. Simpson, in Journal Royal Agricultural Society.*

In addition to the above arguments in favor of under-draining, says Prof. Mapes, the lengthened season of growth may be fairly taken into account. A field in the latitude of New-York, thoroughly under-drained, is rendered thereby nearly as early as one in Philadelphia left in its natural state, so far as under-drains are concerned. We find corn crops on such fields ripen much earlier; and turnips and other late crops planted on thoroughly under-drained soils are not so soon arrested in their growth by winter frosts. In addition to this, we assert, without the fear of contradiction, that one third less manure of an organic kind will answer the purposes of a well under-drained acre, better than of one not so treated.

MIRRORS IN LOCOMOTIVES.

It is very common in Europe to furnish locomotives with mirrors, so arranged that engineers can see the entire train without looking back. This must sometimes be of great service. We were once left in a car upon the road, the engine, tender and one car being separated from us. They went on a long distance before the accident was discovered.

MACHINE FOR PICKING STONES.

This invention consists of a large cylinder, revolving upon an axle, containing four rows of teeth. The cylinder being made to revolve by gear-work, the teeth pick up the stones and deposit them in a box.

UNITED STATES AGRICULTURAL SOCIETY.

The First Annual Meeting of the United States Agricultural Society was holden at Washington, on the 2d of February, 1853, at ten o'clock, in the lecture-room of the Smithsonian Institution.

The meeting was called to order by the President of the Society, Marshall P. Wilder, Esq., of Massachusetts.

The States and Territories of the Union were called in the usual order, and it was found that members from the following States and Territories were present, viz.: New-Hampshire, Massachusetts, Rhode Island, Connecticut, New-York, New-Jersey, Pennsylvania, Delaware, Maryland, Virginia, Ohio, Indiana, Michigan, Texas, Wisconsin, the District of Columbia and Minnesota.

Professor Mapes, of New-Jersey, presented specimens of the Japan pea.

The President then delivered his annual address. It represented the prospects of the Society to be highly flattering; such as should inspire every member with encouragement, and a determination to do all he can towards the furtherance of the great ends of the Association. It alluded successively to the subject of the appointment of members of the National Board of Agriculture; the printing and publication of the Journal of the Society, the first of which, consisting of 144 octavo pages, is already in the hands of most of the members, and a second will be shortly issued; the opening of correspondence and coöperation with distinguished agriculturists and local Associations all over the United States, which the President thinks should be extended even to transatlantic nations, and the assistance of the General Government solicited in regard to it.

The following resolutions were adopted, viz.:

Resolved, That so much of the President's address as refers to the coöperation of this Society with the General Government in the diffusion of agricultural knowledge, the distribution of seeds, plants, &c., be referred to a committee of *three*, with authority to report to the Executive Committee of the Society at such times as may suit their convenience.

The committee finally appointed by the Chair under this resolution, consists of Messrs. King, of New-York; Brown, of Massachusetts, and Medary, of Ohio; the mover having at his own request been excused from serving. The following resolution, by Mr. King, of New-York, from the committee to which was referred the recommendation of the President's address as to funds, &c., was adopted:

Resolved, That the Executive Committee be requested to make immediate application to Congress for that portion of the money now annually appropriated to the Patent Office for the preparation of the Agricultural Report, and the collection and distribution of seeds, with a view to the performance of the same work by the United States Agricultural Society.

Resolved, That the thanks of this Society be tendered the Hon. Samuel Appleton, Thomas H. Perkins, Josiah Quincy, Robert G. Shaw, and others, who have so generously contributed to its funds, and thereby increased the ability of the Society to diffuse agricultural information throughout the country.

Resolved, That Congress be memorialized to establish a Department of the Government, to be called the *Department of Agriculture*, the head of which Department, when established, shall be a Cabinet Officer.

The following gentlemen were elected honorary members of the Society,

viz.: Millard Fillmore, Franklin Pierce, Samuel Appleton, Thomas H. Perkins, Josiah Quincy, Robert G. Shaw, Edmund Ruffin and Prof. Henry.

The Society declined any official connection with the exhibition in the Crystal Palace, considering it as "inexpedient, in their infancy."

Able speeches were made; an address by Mr. Custis was very highly spoken of.

The President of the United States and the Secretary of the Interior were present during one of the sessions.

The officers of the Society for the year ensuing are as follows:

PRESIDENT.

MARSHALL P. WILDER, *of Massachusetts.*

VICE-PRESIDENTS.

Ezekiel Holme, of Maine.
G. W. Nesmith, New-Hampshire.
Frederick Holbrook, Vermont.
B. V. French, Massachusetts.
Josiah Chapin, Rhode Island.
S. D. Hubbard, Connecticut.
Henry Wager, New-York.
James J. Mapes, New-Jersey.
Fred. Watts, Pennsylvania.
C. P. Holcomb, Delaware.
W. D. Bowie, Maryland.
G. W. P. Custis, Virginia.
Henry K. Burgin, North Carolina.
John Witherspoon, South Carolina.
P. M. Nightingale, Georgia.
Richard Jones, Alabama.
Alex. H. Beques, Mississippi.
A. B. Roman, Louisiana.
Samuel Medary, Ohio.
Robert Mallory, Kentucky.
M. P. Gentry, Tennessee.
Joseph A. Wright, Indiana.
S. A. Douglas, Illinois.
R. Atchison, Missouri.
T. B. Flournoy, Arkansas.
J. C. Holmes, Michigan.
—— Baker, Florida.
T. J. Rusk, Texas.
W. F. Coolbaugh, Iowa.
A. C. Ingham, Wisconsin.
—— Homer, California.
J. H. Bradley, District of Columbia.
S. M. Baird, New-Mexico.
H. H. Sibley, Minnesota.
Joseph Lane, Oregon.
Jos. L. Hayes, Utah.

EXECUTIVE COMMITTEE.

C. B. Calvert.
J. A. King.
A. L. Elwyn.
J. D. Weston.
Moses Newell.
Arthur Watts.
Richard Peters.
Joseph C. G. Kennedy, *Corresponding Secretary.*
W. S. King, of Rhode Island, *Recording Secretary.*
William Selden, *Treasurer.*

The following amendments to the constitution were adopted:

The Executive Committee was increased from five members to seven.

The Recording and Corresponding Secretaries to be considered as ex-officio members of the Executive Committee and the General Board of Agriculture.

In the absence of the President of the Society, the Executive Committee shall elect its own chairman.

Four members present shall constitute a quorum of the Executive Committee.

The future annual meetings of the Society shall be held in Washington, on the *fourth* Wednesday of February.

Scenes of Life.—Grace Aguilar says very happily that many scenes of life are holy—the early morn, the twilight hour, the starry night, the rolling storm, the hymn of thousands from the sacred fane, the marriage rite or the funeral dirge; but none more holy than the chamber of the dying, lingering beside a departing spirit, as if the angel shone above the mortal, waiting but the eternal summons to wing his flight on high.

CUTTING FODDER FOR STOCK.

THE following paper from the *New-England Farmer*, by Henry F. French, is worth a careful perusal and a practical regard.—EDS.

"Do you think it will *pay* to cut fodder for stock?" is the question often proposed. The general impression among well-informed farmers seems to be that it *will*.

The report from the Worcester County Society on feeding stock, published in the *New-England Farmer* for July and August, 1852, seems to have been taken as conclusive on the subject. So far as the *opinions* of that committee are concerned, they are entitled to great respect, as are the opinions of many persons named in their report.

A premium had been offered for "the best experiments in determining the advantages or disadvantages of cutting hay as food for stock," and it is to the *experiments* offered for the premium that I wish to call attention.

However correct may be the conclusion of the committee, from *all* their premises, it seems to me that the experiments themselves are far from satisfactory as evidence of the profit of cutting *good hay*, or any fodder that cattle will eat up entirely, *uncut*. Before analyzing the results of those experiments, I had the impression that a great saving in the *quantity* of food actually consumed was made by cutting it; but those experiments, as published, show that *the cattle on which the trials were made consumed a very little more cut than uncut hay, in the same number of days.*

The conditions of the trials were in part as follows:—"The trial to be made with at least two animals—the time of trial to continue at least eight weeks, divided into periods of two weeks each. One animal to be fed with *cut*, when the other is fed with *uncut* hay, and the feed of each to be changed, at the expiration of each two weeks."

Then follow the details of the experiments, as given in a recent number of our journal. The writer then proceeds:

On the whole, the *results* of these experiments are not very satisfactory. They are lacking in uniformity, in almost every particular. They should be repeated, and it seems to me, under different regulations. Two weeks is not a term long enough, for each kind of food. The food of *this* week may make the *fat* of next week. Cows, heavy with calf, are likely to gain in weight on almost any food, and their weight could hardly be expected to vary rapidly by change of food two weeks at a time, except as their bowels might be full or empty. It is proper to say, that all the cattle referred to received other food, either roots or meal, during the experiments, so that it must not be inferred that the quantities of hay above stated are alone sufficient food for such animals.

Having glanced thus at these experiments, I will suggest what seems to me the most reasonable view on this subject. I cut all my fodder for my horses and cows this winter, not because I suppose that there is any nutriment added to a lock of hay by cutting it into inch pieces, nor because nature has in general furnished animals with *hay-cutters* of their own, insufficient properly to masticate their food. Horses have powerful grinders, and usually chew their hay sufficiently. An experiment, reported in the Patent Office Report for 1851, at page 71, shows, that the food of a horse, fed on *uncut* hay, was equally exhausted of its nutritive properties in passing through the animal, as when fed on *cut* hay.

Ruminating animals, if they swallow their food hastily, may chew it over again at their leisure, and this seems to be a very innocent and becoming recreation for a cow that has nothing else to do. The advantages of cutting fodder, I apprehend, are these:

1st. Working cattle and horses thrive better on cut fodder, because *they eat it in less time*, and have more time for rest. And besides, they are not so liable to lose their breakfast by the oversleeping of the teamster.

2d. Old animals, whose "grinders are few," can eat chopped food more readily.

3d. Chopped hay can be readily *measured*, and the animals receive a more *regular allowance* than when fed with long hay.

4th. No hay will be *wasted by over-feeding*, as your boys will be too lazy to cut more than is needful, whereas common hands will always *fill the rack* more or less, if they pitch the hay to the animals.

Lastly, and most important of all, if we have corn-stalks, buts, fresh hay or coarse clover which cattle will never eat entirely up, such fodder may be passed through the hay-cutter, and they will eat it more readily. At the present price of hay, (about twenty dollars a ton,) grain is cheaper than good hay for cattle. By cutting coarse fodder into a box, moistening it, and adding a small quantity of meal or shorts, much may be consumed to advantage that is usually thrown into the yard for manure.

No good farmer will be long without a hay-cutter. Whether it be worth his while to chop all his hay or not, may be doubtful, but he will every year find occasion for its use, for one or more of the reasons already suggested.

This matter of chopping fodder is another of the thousand that needs careful investigation at the hands of Boards of Agriculture, and upon our *anticipated* Model Farms.

DWARFING FRUIT TREES.

The French have a method of cultivating dwarf fruit trees, or trees which have been stunted by a certain process, which their writers describe as follows:

"Young trees are to be treated in the following manner: If there are more than three shoots on the plant, reduce them to that number, and shorten each to three, four, or six eyes, according to their strength. The following season, reduce the number of leading shoots to six, and shorten them to three fourths of their length, and spur in the remaining shoots. The tree should be managed in every respect in this manner, until it has attained the required size, which, of course, depends upon the fancy or convenience of the owner or conductor of the garden. I make a point of letting the trees take their natural form of growth, as far as the system described will admit; for I consider it of little consequence what shape is given to the tree, provided my end is attained; that is, to make every branch, as it were, a long spur, with bearing buds from the extremity to the base."

It is asserted by both French and English writers, that trees so stunted are not so much exposed to injury from high winds, that they produce better fruit, bear earlier and more abundantly, and occupy less space. Dwarfs are also produced by inoculating on stocks of small growth. The apple is often inoculated on the Paradise or *Douciu* stock, the peach on a slow-growing plum, and the pear on the quince. We have seen large pears on trees not

more than five feet high, the tops of which were not possessed of sufficient strength to sustain their weight of fruit without the assistance of props. This is a common result where some varieties of the pear are set in quince stocks. The writer above quoted says:

"Two or three years' trial of this method only might possibly deter many from a continuance of it, in consequence of the young wood which will be produced yearly at first, and from the apparent difficulty of getting rid of the superfluity. But that inconvenience will be utterly surmounted if the foregoing instructions are attended to, and the consequence will be the possession of both healtly and fruitful trees."

THE PENGUIN.

M. CHATEAUBRIAND speaking of *sea-fowl*, says they have places of rendezvous where you wo ld imagine that they were deliberating in common on the affairs of their republic; it is, in general, a rock in the midst of the waves. He passed whole days in studying the manners of the fowl inhabitants of the island of St. Pierre. The best understanding prevailed in that republic of birds. Immediately after the birth of a citizen, his mother precipitated him into the waves, like those barbarous nations who plunged their children into rivers, to inure them into the fatigues of life. Altogether, the study of these sea-fowl convinced him how productive and how rich were the lessons of Nature, when viewed with an attentive eye.

The above engraving represents the Penguin, an inhabitant of the South Sea Islands, and the coasts of South America, particularly Patagonia. It is about three feet high, when standing. Its back is black, and its front parts white. It is the fast swimmer of the feathered race. On land it has neither legs to run with, nor arms to fight. The water is its true element, and only safety. Its feet are placed so far back that it cannot balance its body, like other birds, and it therefore stands erect, as in the engraving. Their wings are more like fins than plumage, and they use them as oars, to assist their speed through the water. When there is no danger of man's intrusion, the

Penguin hatches her eggs in the sand; but in situations frequented by men, she digs a hole several feet deep into the earth, to deposit her eggs. The voice of the Penguin is like that of the goose. Its flesh is fat, but is too fishy to be used as food.

UNDER-DRAINING.

I WISH to call the attention of the farming community to the practical utility of under-draining wet or moist land. Having a piece of ground naturally too wet to bear any kind of crop, about two years since I commenced by digging a deep ditch through the centre of it, stopping the sides, so that it would support itself. This ditch was two and a half to three feet deep, four feet wide on the top, one foot at bottom. The ground naturally descended towards the centre, and towards the outlet of this ditch. I then laid a blind ditch with drain tile at right angles with the main ditch at its head, and extended them as far as the ground appeared moist. The tile in this case which I used, was the second size horse-shoe: some of it I put a board under, and some I laid without. I also laid two more lateral ditches with tile, about one hundred feet from the first, there being a cross-walk. Where this last ditch was laid, one side I put down a board, and on the other none. This fall, having had a trench dug on the side of this walk, for the purpose of setting out some standard dwarf trees, I took up the ditch which had no shoe or board under it, and found it entirely clean, and not filled up in the least. I then put it down a little deeper, so as to drain below the bottom of the trench. I mention this to show, that even in sandy ground (this was such land) with a moderate regular fall, there is no danger of the drains filling up, which I had heard might be the case. I have since put down several more lateral drains to this main ditch, using the round tile, all of which work to my entire satisfaction.

I would mention that these tiles are made at Bloomfield Centre, by Mr. John Daines. The expense at the factory is twenty-five cents per rod for the large size, and twenty cents per rod for the second size, the round or pipe tile being also twenty cents per rod.

When the ditch is not too long, the pipe tile are equally good, and will obviate all necessity of a shoe in any soil. I practise putting over the lists, shavings from a joiner's shop; they answer my purpose: when these cannot be obtained, straw may be used, or an inverted sod. I consider shavings the best. From two years' trial, I can confidently recommend the drain tile made by Mr. Daines, as more than answering my expectations.

SUMAC.

THE following, taken from the *Agricultor*, speaks like one who understands the subject, and may be serviceable to some of our readers:

TINTON FALLS, Monmouth Co., N. J.

Sir,—The article of sumac, which is so extensively used in manufacturing morocco and sheepskins for shoe linings, &c., is very high, selling at from $90 to $100 per ton of 2240 lbs. In my opinion, it is well worthy the attention of the farmer. To be sure our sumac is not so good as that im-

ported from Spain, but it is worth from $30 to $40 per ton, when properly cured. Every body knows that sumac will grow on very poor land.

As there are several different kinds of sumac, I will give you a description of the kind that is used by dyers and morocco-dressers. It grows on high ground, and has a smooth stem and leaf, and red stem, with a large pointed bob or bunch of berries, which turns red about the last of July and the first of August. At this time it should be gathered, or from the last week in July, through the month of August. The manner of the curing process is as follows: Take a fair day, if possible; cut or break off the stem with the leaves, and take them to an open space, and spread them to dry. Turn them as often as may be necessary to get them dry. The quicker it dries, the better. There is great danger of its heating; it will heat sometimes in two or three hours. If not dry by night, it should be put under cover and spread out thin, or put in small winnows and turned over before the sun dries the dew off; then, thrashed on the barn floor fine, and stems raked out, it is ready for market. No doubt there might be saved to the country many thousands of dollars which are now lost. I will pay the highest price for sumac well cured.

THOS. GUEST.

DAIRY BUSINESS IN CENTRAL OHIO.

A WRITER in the *Ohio Cultivator* says:

My opinion, based upon my own experience and observation, is, that the Durhams as a distinct breed are not superior to the native, yet to cross them with the native would be an advantage.

As regards the profits of cheese-making compared with that of butter-making, I have made but one experiment. From that alone, I found that from equal quantities of milk, what made 1 pound of butter would make 2½ pounds of cheese and a fraction over. All dairymen that I have conversed with, are of the opinion the difference is still greater; that the milk that would make 1 pound of butter would make 3 pounds of cheese. Whether their opinion was based upon experiments I am not able to say. The profits of one compared with the other, would depend upon the price each would bring. I have milked the past season, 17 cows; one went dry the first of September. Their earnings are as follows:

6,289 lbs. cheese, sold for 7 cents per lb.,	$440 23
1,378 " retailed from dairy at 8 cents,	110 24
363 " on hand not sold, at 7 cents,	25 41
119 lbs. butter sold, at 16 cents per lb.,	19 04
228 lbs. cheese consumed and reserved for family, at 7 cents,	15 96
300 lbs. butter consumed in family, at 16 cents per lb.,	48 00
5 calves sold when three days old,	5 00
12 calves' skins, taken off when three days old and tanned on shares, 75 cents each,	9 00
Estimated value of whey fed to hogs,	50 00
Amounting in all to	$722 88
Average amount per cow,	$42 52

With respect to rich and poor milk in making cheese, I would rather have a cow that would give a large quantity and rich; but if I could not have one

that possessed both qualities, give me one that would give a large quantity, and not quite so rich.

I moved to this State eight years ago from Lewis county, one of the best dairy districts in New-York. My friends there said good butter and cheese could not be made in Ohio. I am now able to convince them by samples, that as good butter and cheese can be made here as in any other State; and I would be glad to show them in print that, in quantity or yield per cow, we are not behind other States.

NEW INVENTION FOR OVERCOMING STEEP GRADES.

We take the following extracts from a recent report by a committee of the United States Senate. It promises something highly important:

The apparatus by which adhesion to any extent desired by the engineer may be produced at pleasure, is a simple, compact mechanical contrivance, costing but a few hundred dollars, readily attached to any engine, and may be thrown in or out of gear instantly by the turning of a steam-cock. When out of gear, it is lifted some twelve or eighteen inches above the rails; and the engine in no way differs from the common locomotive, but runs readily, by the adhesion due to its weight, over the level portions of the road.

This plan, therefore, adds nothing to the expense of constructing a railroad save a small increase in the weight of the rail on heavy inclines, where a large business is done; but saves time and expenditure in grading, reduces the weight of the engine, and consequently the working expenses of the road; gives greater security to railway travelling, and suggests the introduction of railroads with machinery so light as scarcely to exceed in weight the ordinary mail stage.

Surely the present system must be regarded as greatly defective, when to express even the President's message, contained in a few newspaper slips weighing but a few pounds, can only be done by some thirty or forty tons of machinery; and the disproportion throughout the system between the dead weight and paying load, whenever passengers or light articles are transported, is so great as to account readily for the great depreciation in railway stocks. This invention, by substituting pressure for weight, equalizes this disproportion, and suggests an entire change in a system which has absorbed, and is absorbing, all the floating capital of the world. It proves that millions of dollars have been unnecessarily expended, and, looking to the future, multiplies roads and distributes their advantages at a greatly reduced expenditure of time and money.

Your committee have no doubt that on this plan, far cheaper railroads may be constructed and safely worked, with corresponding light machinery, than any now in use; nor can they doubt that, by it, an engine may be made to ascend any required grade. These things are perfectly apparent from the working model which has been submitted to our inspection, and we see nothing whatever to justify us in the assertion that this invention will not accomplish all the inventor claims for it. Some few years after the building of the Liverpool and Manchester Railway, a centre rail, pressed by two horizontal wheels, driven by extra cylinders, was tried in England, and found too complicated for use; and all these various contrivances have, with slight modifications, from time to time been brought before the American public. In addition to these, many other plans have also here been resorted to to obtain

the same end. The tender, by means of a lever, has been made to add a portion of its weight to that of the engine, when required; the steam of the boiler has been conveyed into perpendicular cylinders, and made to exert its entire pressure on the driving-axles; and the ordinary driving-wheels of the engine have, on inclines, been substituted for very small wheels running on elevated rails, thus increasing the power of the diameter of the driving-wheels. Magnetism has also been invoked, to furnish the necessary adhesion, with many other suggestions which we have not time to enumerate. None of these, however, have answered the purpose; and the growing wants of the railway have only been supplied by heaping weight upon the engine, until it has become a huge steam tug, with the sand-box as an appendage for sprinkling the rails—thus carrying within itself elements of destruction which no road, however well built, can long withstand; for, while the huge engine presses the road into the earth and laminates the rails, the sand which it sprinkles cuts away its journals and greatly adds to the wear of the road.

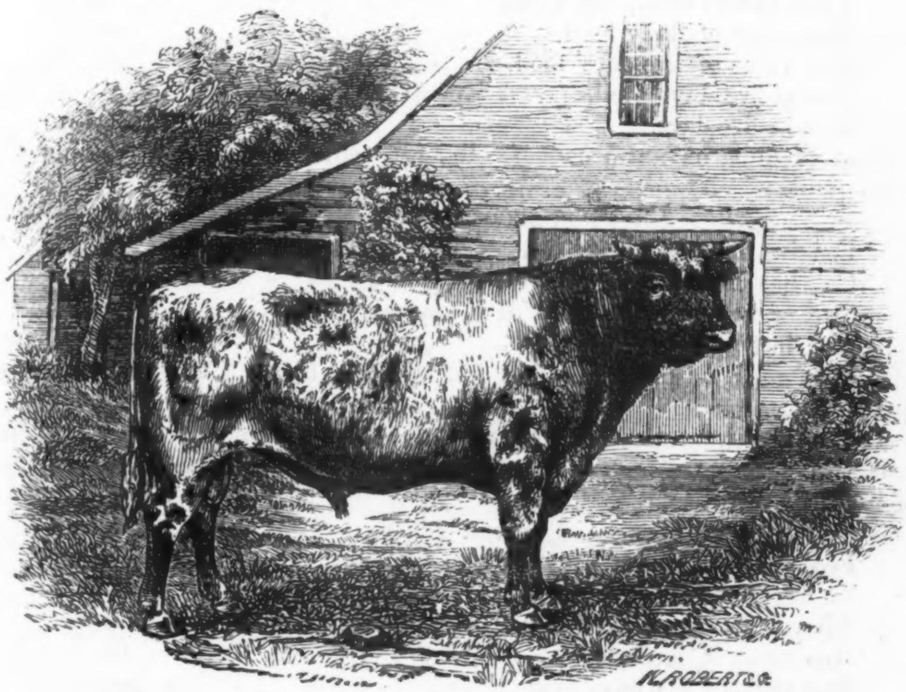
We have examined and reviewed all these various plans, for the purpose of comparing them with the one now before us; and while they serve to strengthen our convictions that the railway system can never be perfected so long as weight limits the power of the engine, they confirm us in our belief that Mr. French's plan is the most simple, the most effective, and most readily adapted to the present system, which has yet been suggested.

The model which has been for some time working in the Capitol shows at a glance the whole arrangement. It consists of a common wooden superstructure, with a flat bar-rail: the ends of the cross-timbers are cut off flush with the sleepers, and the flat bar resting on the sleepers projects over on the outside of the track, forming a clear continuous space on each side of the road for friction rollers, or small wheels, to revolve up against the projecting edge of the rail. The cranks are attached to the ends of the driving-axle, and between these and the driving-wheels is suspended from the axle, on each side, a friction roller, or wheel, which is made to drop at pleasure directly under the driving-wheels. Using the driving-axle as a fulcrum, by means of a compound lever, these friction rollers or wheels are pressed up at pleasure, and to that extent press down the driving-wheels, producing instantly whatever amount of adhesion may be required. The tread of the driving-wheels is as wide as the rails, and the friction rollers revolve just under them, with flanges to prevent their rubbing the sides of the road. These friction rollers or small wheels, when not required, are instantly thrown up some eighteen inches above the track, where they remain until they are again required, when they are instantly thrown into gear. This facility of removing them adapts the engine in all respects to the common road, and requires a modification of the rail only in working the inclines.

Experiment teaches that one pound of iron suspended from a pulley will move on a plane six pounds of iron, resting on iron; hence it is said, the adhesion of iron upon iron is equal to one sixth the insistent weight. If this be so, it requires six tons of weight to be added to the engine to give it one ton of adhesion—six pounds added for every one pound gained. But actual practice on railways shows that adhesion is not worth so much, but is, under ordinary circumstances, probably nearer one eighth or one ninth of the insistent weight, and fluctuates greatly below the standard when affected by the weather; so that it will be seen, while the size of the boiler and its effective power may be increased directly in proportion to the weight added, the adhesion of the engine cannot be, but, for every eight or nine pounds added, can gain but a single pound; yet the adhesion limits the tractile power of the engine. It is,

therefore, and has ever been, since the introduction of the present system, the object of the engine-builders to make these forces proportionate; for if the steam-power be greater than the adhesion, the wheels will *revolve*, but not *progress;* if less, the engine remains stationary.

SHORT-HORN BULL "BACKWOODSMAN."



THE above cut is an excellent likeness of the short-horn bull, "*Backwoodsman,*" winner of the first prize in class bulls over three years old, at the Cattle-show of the American Institute, in October, 1852. He was also winner of the first prize in the same class, at the show of the Dutchess County Agricultural Society, in same year. He is owned by Mr. Samuel Taber, Chestnut Ridge, Dutchess county, New-York.

MILK-PRODUCING FOOD.

THE following paper was read before the Agricultural Society of Worcester county, Mass. As the result of practical experiments, the statements made by Mr. Brooks cannot but prove interesting and instructive.

GENTLEMEN:—Herewith you have an account of some trials in feeding which I have made within the last three months, with a view to determine the relative value of different kinds of food for producing milk, and the proportion of solid manure to the hay consumed. I have purposely delayed this communication beyond the time named in the Society's rules for having all applications for premiums on feeding filed with the Secretary, (the 15th March,) because I do not propose for a premium, but wish only to add whatever I may to the interest of this important subject. You, then, gentlemen,

will not consider me as competing with gentlemen proposing for premiums, but will dispose of this communication in any way you deem proper.

Dec. 17, 1851, commenced feeding two cows about seven months after calving; the cows were gravid, and expected to calve about the last of March next; live weight, 1,000 lbs;—one of them 44, the other 31 months old. Each trial continued five days. First five days fed on 2 per cent. of live weight of

Cut hay daily, - - - - - - -	32 lbs.
2 lbs. Indian meal, hay value, - - - - - - -	8 "
Hay value of daily food, - - - - - -	40 "
Hay value of five days' food, - - - - - -	200 "
Cost of five days' food, hay at $\frac{1}{2}$ cent per lb., $1	
Milk in five days, - - - - - - -	61,875 lbs.

Cost of milk, hay at $\frac{1}{2}$ cent per lb., $1\frac{6}{10}$ cents the lb., or $3\frac{3}{32}$ cents the wine quart.

SECOND TRIAL.

Fed five days on $2\frac{1}{2}$ per cent. of live weight of cut hay daily, 70 lbs.	
Cut hay in five days, - - - - - - -	200 "
Cost of five days' food, hay at $\frac{1}{2}$ cent per lb., - -	$1
Milk in five days, - - - - - - - -	60 lbs.

Cost of milk, hay at $\frac{1}{2}$ cent per lb., $1\frac{6}{66}$ the lb., or $3\frac{3}{32}$ cents the wine quart.

These trials show that 2 lbs. of Indian meal are very nearly equal to $\frac{1}{2}$ per cent. of live weight of hay, or that one pound of meal is equal nearly to 4 lbs. of good English hay.

THIRD TRIAL.

Fed five days on cut hay, - - - - - - -	16 lbs.
32 lbs. oat straw, hay value, - - - - - -	16 "
2 lbs. Indian meal, hay value, - - - - - - -	8 "
Hay value of food daily, - - - - - - -	40 "
Hay value of five days' food, - - - - - -	200 "
Cost of five days' food, hay at $\frac{1}{2}$ cent per lb. - -	$1.07
Deduct 5 lbs. hay and straw not consumed, - - -	.02$\frac{1}{2}$
Milk in five days, 50 lbs., - - - - - -	$0.97

Cost of milk, hay at $\frac{1}{2}$ cent a pound, 1.95 cents the lb., or 3.90 cents the wine quart. The hay and straw cut, and given wet; the meal sifted over the hay and straw. This trial seems to show that 2 lbs. of oat straw is not equal for milk to 1 lb. of hay.

FOURTH TRIAL.

Fed five days on cut hay daily, - - - - - -	16 lbs.
Oat straw cut, 32 lbs., hay value, - - - - -	16 "
2 lbs. Indian meal, hay value, - - - - - -	8 "
Hay value of five days' food, - - - - -	200 "
Deduct 6 lbs. not consumed, - - - - -	6 "
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Cost of five days' food, hay at $\frac{1}{2}$ cent per lb., - -	$0.97
Milk in five days, $48\frac{6}{10}$ lbs	

Cost of milk, hay at $\frac{1}{2}$ cent per lb., $1\,\frac{9}{95}$ cents per lb., or 3.99 cents the wine quart. The hay, straw, and meal were given dry, and the trial shows that dry hay, straw, and meal are not so good for milk as when wet.

Feb. 3, 1852, commenced feeding two cows, one 33 months old, 14 days after calving; live weight 1,000 lbs. The other 31 months old, 14 days after

calving; live weight 690 lbs. These cows were fed five days on 42 lbs., or $2\frac{1}{2}$ per cent. of their live weight, of uncut hay, and 50 lbs. of flat turnips daily.

Uncut hay daily, - - - - - - -	42 lbs.
Turnips, 50 lbs., hay value, - - - - - -	10 "
	52 "
Hay value of five days' food, - - - - -	260 "
Cost of five days food, hay at $\frac{1}{2}$ cent per lb., - -	\$1.30

Milk in five days, $153\frac{6}{25}$ lbs.

Cost of milk, hay at $\frac{1}{2}$ cent the lb., $\frac{8}{46}$ of a cent the lb., or $1\frac{6}{92}$ cents the wine quart.

SECOND TRIAL.

Fed five days on cut hay,

Cut hay daily, - - - - - - -	42 lbs.
Turnips 50 lbs., hay value, - - - - -	10 "
	52 "
Hay value of five days' food, - - - - -	260 "
Deduct 5 lbs. not consumed, - - - - - -	5 "
	255 "
Cost of five days' food, hay at $\frac{1}{2}$ cent per lb., - -	\$1.27$\frac{1}{2}$

Milk in five days, $152\frac{1}{2}$ lbs.

Cost of milk, $\frac{8}{37}$ of a cent per lb., or $1\frac{6}{74}$ cents the wine quart.

The cows did not eat the cut hay quite so well as the long hay on the first trial, so that on the whole, the experiment shows a small difference in favor of cut hay.

THIRD TRIAL.

Fed same as second trial, except 3 lbs. Indian meal, instead of 50 lbs. turnips.

Cut hay daily, - - - - - -	42 lbs.
3 lbs. Indian meal daily, hay value, - - - -	12 "
	54 "
Hay value of five days' food, - - - - -	270 "
Deduct 10 lbs. hay not consumed, - - - -	10 "
	260 "
Cost of five days' food, hay at $\frac{1}{2}$ cent the lb., - - -	\$1.30

Milk in five days, 153 lbs.

Cost of milk, hay at $\frac{1}{2}$ cent per lb., $\frac{8}{49}$ of a cent per lb., or $1\frac{6}{89}$ cents the wine quart. This trial seems to prove that 3 lbs. of Indian meal is equal to 12 lbs. English hay, or 50 lbs. flat turnips, for milk.

FOURTH TRIAL.

Fed on cut hay daily, - - - - - -	42 lbs.
33 lbs. carrots daily, hay value, - - - - -	11 "
	53 "
Hay value of five days' food, - - - - -	265 "
Deduct 5 lbs. hay not consumed, - - - - -	5 "
	260 "
Cost of five days' food, hay at $\frac{1}{2}$ cent per lb., - -	\$1.30

Milk in five days, 150 lbs.

Cost of milk, hay at $\frac{1}{2}$ cent per lb., $\frac{8}{63}$ of a cent per lb., or $1\frac{7}{26}$ cents the wine quart. This trial shows that 33 lbs. of carrots are not quite equal for milk to 50 lbs. of flat turnips, or 3 lbs. of Indian meal. The cows in all the trials had free access to water.

December 10, 1851, commenced feeding one cow 72 months old, one do. 46 months old, one do. 48 months old, 5 heifers 32 months old, 7 heifers 22 months old, 4 calves 9 months old, 4 calves 8 months old. These cattle weighed, live weight, 14,567 lbs., and were fed 5 days on 277 lbs. of cut hay daily, and drank daily 887 lbs. of water, dropped daily 668 lbs. solid manure, or 2.41 lbs. of manure for 1 lb. of hay consumed.

Second trial commenced Dec. 16, 1851. Fed same cattle five days on 352 lbs. hay daily, solid manure dropped daily, 860 lbs., or 2.54 lbs. for 1 lb. hay consumed; drank daily 868 lbs. water.

February 28, commenced feeding one cow 72 months old, one do. 96 months old, and one 48 months old, 3 heifers 32 months old, and 6 heifers 22 months old. The live weight of these cattle was 9,472 lbs.; these cattle were fed five days on 240 lbs. cut hay daily; solid manure dropped daily, 594 lbs., or 2.47 lbs. of manure for 1 lb. hay consumed. Drank daily 542 lbs. water.

Hay consumed in the three trials, 869 lbs.

Manure dropped in the three trials, 2,122 lbs.

The proportion of manure to hay is as 2.44 lbs. of manure weighing 50 lbs. the cubic foot.

Manure, after remaining under my barn one year, weighing 44 lbs. the cubic foot, a loss of 6 lbs. in one year, or 12 per cent. of its weight when recently dropped. JOHN BROOKS.

Princeton, March 22, 1852.

We append to this, the following account of another experiment of the same kind. It is from a correspondent of the Massachusetts *Spy*, and describes the feeding of a cow belonging to Rev. George S. Ball, of Upton, and also the quantity of milk and butter produced:

From the first day of June until the first day of November, 150 days, she gave 2,330 quarts of milk. Average per day, 15½ quarts. The highest number of quarts during any one day in this time, was 21½. Also, from the same date, from the third of June to the first of January, 1853, 211 days, 3,058 quarts. The average per day, for nearly six months, was a very small fraction less than 14½ quarts. This milk was worth 3½ cents per quart. Amount, $107.03. And reduced to hhds. would give 12 hhds. 8 gallons, 2 quarts.

Actually sold—	Milk, - - - - - - -	$51.82
	Butter, - - - - - - -	14.00
		$65.82

besides milk and cream for family use in abundance.

The cow has been fed on grass and hay, and had the value of five quarts of wheat per day, until Nov. 1st, and since that time, the value of six quarts of wheat shorts. The feed has been changed several times. Corn meal has been tried, cobs and corn ground together, and oat-meal mixed with ground cobs and corn. The latter was found excellent feed, producing milk of good quality, and in good quantity. But for quantity, wheat shorts mixed with scalding water, until it will absorb no more, and remain the consistency of dough, well salted, was found much the best; but the quality of the milk not equally good.

MUSH.

"OH, how it makes me blush
To hear the Pennsylvanians call thee Mush."

THE following is from a Michigan paper. Will our Yankee friends try it? If they prefer the word, they can call it "Hasty Pudding;" or if any of the descendants of the Knickerbockers insist on calling it "Suppawn," no body will quarrel with them. Mush, Hasty Pudding, and Suppawn are all the same thing:

"A friend writes us as follows: In a late number you have something about mush. Let me suggest for the comfort of those who stir it an hour or two, and then labor a great while to wash out the pot in which they boil it, that all this trouble may be saved by cooking it in a tin pail, set in a pot of boiling water, and after it has cooked, letting it cool in the same, after which it will slip out in a mass, leaving all clean behind it. Whosoever tries this plan will never try the old one again, for it prevents the possibility of burning the mush, and dispenses with all care and trouble except occasionally to replenish the water in which the pail is set to boil. As to the length of time required, the rule is, 'the longer the better.'"

FORMULÆ FOR THE CONSTRUCTION OF PARTS OF MACHINES, &c.

WE find a very useful article on this topic in the *American Polytechnic Journal.* Experiment alone can determine the accuracy of the rules which are given by the writer, but they are commended by reliable authority. The article before us is translated from the German of Redtenbacher, Professor of the Polytechnic School of Carlsruhe.

In the application of these mathematical rules, they must be modified as circumstances may require, but they furnish data of a general character of great convenience to the mechanic. A large amount of material and of labor is, no doubt, wasted, through the want of definite knowledge of these matters. We shall be glad to present similar illustrations in other departments of the mechanic arts,

1. *Ropes:*—In determining the diameter of ropes for the support of a certain weight, not more than the fifth part of their actual strength should be brought into actual use. Accordingly, the diameter (d) of a rope, expressed in inches, which supports with safety a weight, D, (pounds avoirdupois,) is found by the following formula:

$$d = 0.03 \sqrt{D}.$$

For example: a rope is required to support a weight of 1,759 lbs. The equation stands thus:

$d = 0.03 \sqrt{1759}$. But $\sqrt{1759} = 41.9$ and $41.9 \times .03 = 1.26$ inches, the diameter required.

2. *Chains:*—One third the absolute strength of chains may be safely brought into use, and D being the weight to be raised, as before, the diameter of the chain iron required is found by the following formula:

$$d = .0074 \sqrt{D}.$$

Thus, what diameter of chain is necessary to support 1378 lbs.?

$$d = .0074 \sqrt{1378}; \text{ or } .0074 \times 37.12 = 0.28 \text{ inches.}$$

3. *Screw bolts and nuts:*—By comparing the dimensions of the screws as

they are generally used in machinery, the following rules have been established:

a, FOR SCREWS WITH TRIANGULAR THREAD.

d represents the diameter of the rod before the thread is cut. *d'* the diameter of the rod where the thread is cut, excluding the portion appropriated to the thread; *h* is the depth of the nut, and D' is the diameter of the nut.

$$d = .029\sqrt{D}.$$
$$n = \sqrt[3]{481 \times d - 62.5}$$
$$d' = \frac{n-2}{n}d$$
$$h = .09 \times 1.193\, d.$$
$$D' = 0.2 \times 1.415\, d.$$

b, FOR SCREW BOLTS WITH SQUARE THREAD.

$$d = .029\sqrt{D}.$$
$$n = \tfrac{1}{2}\sqrt[3]{481.d - 62.5}.$$
$$d' = \frac{n-2}{n}d.$$
$$h = .094 \times 1.634\, d.$$
$$D' = 0.2 \times 1.415\, d.$$

4. *Rivets* :—Let *s* be the thickness of the sheet iron to be riveted.

Diameter of the rivets is	2 *s*
Distance " "	5 *s*
Distance of the edge of sheet iron from the centre of the rivet	3 *s*
Diameter of the semi-spherical head	3 *s*
" " conical head	4 *s*
Heights of both these heads	1.5 *s*

RAILROAD IRON.

The progress of our railroads is an interesting subject, in connection with the supply and prices of railroad iron; and it is well to keep the former in view, as a means of estimating the probable future price of this most important article in our great enterprises. The increased mileage of our railroads for the past few years has been as follows:

		Annual Increase.
Number of miles opened, January 1, 1848	5,565	——
" " " " 1849	6,397	832
" " " " 1851	8,856	1,215
" " " " 1852	10,814	1,958
" " " " 1853	13,314	2,500

We estimate the mileage opened the present year, to be 3,075; which certainly is not above the mark. Assuming a favorable condition of the money market, the mileage opened in 1854 will be at least 3,500 miles. On the 1st day of January, 1855, therefore, or a little less than two years from this time, there will be 20,000 miles of railroad in operation in the United States. In the meantime a large amount of double track will be laid, say from 800 to 1,000 miles. At the present weight used, it requires about 100,000 tons of rails to every 1,000 miles of new road. Upon all the railroads

in the United States, therefore, there will be laid on the first day of January, 1853, over 2,000,000 tons of railroad iron. But the amount that goes into rails makes but a small portion of the aggregate for which railroads create demand and consumption. The consumption consequent upon and immediately following the construction of railroads is probably three times greater than the quantity used for rail. Should this estimate prove correct, it will be seen that the demand for rails will bear but a small proportion to that for other objects. How is this demand to be supplied? Largely by our own works, no doubt. We shall also be compelled to obtain extensive supplies from the foreign maker. We state these facts as means of forming a correct estimate as to the future. From the data given, parties must and will make such figures as will suit themselves, as to the prospective price of rails. We presume the make in this country, as well as in Great Britain, will be rapidly increased to supply the immense demand which is inevitable.

NEW BOOKS.

The Phonographic Teacher, being an Inductive Exposition of Phonography, &c. By E. Webster. Fowlers & Wells. 1852.

This little manual is intended to afford complete and thorough instruction to those who have not the assistance of an oral teacher. It is well adapted for this class, and of course for all classes. The lessons are regularly progressive, and sufficient in number and extent to give a good system to the pupil. We discover some changes in the use of certain characters from that to which we have been accustomed, and several of these changes we highly approve. Of a few we are doubtful. The use of that for *w*, which (or the half representative of which) has been used to express *rd*, the word-sign for *word*, the new character for *ought*, and perhaps one or two others, break in upon the system of signs, and being anomalous, are therefore objectionable. But other signs, new to us, are of great convenience. Some few of the reading lessons are so printed as to present indefinite marks, which even an adept would find himself unable to decipher at once. But these imperfections of type are few, and will no doubt be corrected. Notwithstanding these criticisms, we regard it as an excellent book, decidedly the best printed in this country for the use intended. Another is provided for the pupil when this is mastered, called the "Universal Phonographer," which the publishers highly commend, but which we have not seen.

The Progressive Farmer: A Scientific Treatise on Agricultural Chemistry, the Geology of Agriculture, on Plants, Animals, Manures, and Soils, applied to Practical Agriculture. By J. A. Nash, Principal of Mount Pleasant Institute, Instructor of Agriculture in Amherst College, and member of the Massachusetts Board of Agriculture. New-York: C. M. Saxton, Agricultural Book Publisher. 1853.

The character of this work is set forth in its title. It is the result of an effort on the part of its author to "render science available to practical farmers, to young men desirous of qualifying themselves for so useful an employment, and especially for the more advanced classes in our public schools." To these purposes it is well adapted; and we commend it to the notice of all, especially of young men who feel an interest in agricultural science.

Philosophy of Mysterious Agents, Human and Mundane; or the Dynamic Laws and Relations of Man: embracing the Natural Philosophy of Phenomena styled Spiritual Manifestations. By E. C. Rogers. Boston: J. P. Jewett & Co. Cleveland, O.: Jewett, Proctor & Worthington. 1853. pp. 336.

In this volume Mr. Rogers takes hold in earnest of the pretensions of spiritual rappers and that whole sisterhood. He argues the question in the light of philosophy; and while he gives credit to the statements of fact as to these several phenomena, and cites other and similar occurrences from various countries and at various times, he shows

that all these motive-powers are material, and that while they cannot be induced by spiritual influence, there is abundant reason for regarding them as the effect of "human and mundane" agents. Some parts of this discussion we may refer to hereafter. The whole matter belongs, of course, to the department of animal physiology.

Annual of Scientific Discovery; or Year-Book of Facts in Science and Art, for 1853, *&c.* Edited by David A. Wells. Boston: Gould & Lincoln. 1853. pp. 404.

By the courtesy of Messrs. Lewis Colby & Co., we have received a copy of this useful work. No volumes, perhaps, have been published which more unanimously receive the commendations of the press; and in our judgment they are worthy of the favor with which they have been received. The latest volume, the fourth of the series, is well executed, and as full of interest as its predecessors.

The Captive in Patagonia; or, A Life among the Giants. A Personal Narrative. By Benjamin Franklin Bourne. With illustrations. Boston: Gould & Lincoln: New-York: L. Colby & Co. pp. 233.

This is an attractive volume. Its exterior is handsome, in all respects worthy the eminent publishers. The style of the narrative is plain and simple, and its novelty will excite the curiosity of all. From a partial reading of the volume, we are persuaded that it has the interest of a well-planned novel.

Chambers's Repository of Instructive and Amusing Papers. With illustrations. Vol. I. Complete in itself. Boston: Gould & Lincoln. 1853.

Those who are familiar with Chambers's Miscellanies will not doubt the merit of these little stories. Those volumes obtained "a circulation of more than 80,000 copies in England." The American edition of these numbers will be issued simultaneously with the English, "in two monthly handsomely bound 16mo volumes, of 260 pages each," till completed, each volume being complete in itself.

The Society of Friends. A Domestic Narrative, illustrating the peculiar Doctrines held by the Disciples of George Fox. By Mrs. J. R. Greer, author of "Quakerism; or, the Story of my Life." New-York: M. W. Dodd. 1853.

The stories or dialogues forming this narrative call forth from the parties concerned in them the religious views which they entertain, and seems candid and impartial, though we are not particularly skilled in the theology of the sect. The book is quite readable, and is well executed.

Description of One Hundred Cities and Large Towns of America, with Railroad Distances through the United States, and Fourteen Maps, &c. Phelps, Fanning & Co., 195 Broadway. 1853.

This pamphlet, though recently published, is having a very great sale. It deserves it It is well executed in matter and manner. It gives maps of the principal places in this country, of sufficient size for convenient reference.

Putnam's Monthly.

Number III. of this choice Magazine of Literature, Science, and Art, is before us. This magazine presents high claims to public favor, combining, as it does, much solid and useful reading with the elegant and sprightly, and affording a delightful *mélange* for the reader. The description of Japan, in the present number, is timely and interesting. "Mary Spears" is the title of a border narrative of more than ordinary interest. Bancroft, as an American historian, receives the high commendation to which he is justly entitled.

The Flower Queen, or the Coronation of the Rose: a Cantata in two parts, for the use of Singing Classes in Academies, Female Seminaries, and High Schools, adapted especially for Concerts, Anniversaries, or other festive occasions, and also for the socia circle. By George F. Root. New York: Mason & Law, 23 Park Row.

We have here a volume of 93 pages of music of a peculiar character. The title informs us what it is, and it will, no doubt, remind many of our readers of that other popular com-

position, *The Song of the Bell*, the words of which are by Schiller. We have listened to the latter with great pleasure when rendered by a skilful company under the direction of Mr. Mason.

The words of the Flower Queen were composed by a graduate of the Institution for the Blind. Our fair authoress certainly possesses in a remarkable degree the ability to conceive beautiful thoughts, and to clothe them in beautiful forms.

The plot is as follows: The flowers meet to elect a queen; each presents her own claims to this honor, the Crocus asserting that she appears earliest in the spring, the Dahlia boasting of her "beauteous bloom and stately form," the Heliotrope, Mignonette, Japonica, &c., the Sunflower among the rest, though in a semi-comic strain, all having some peculiar fitness for the station. A discontented, peevish stranger, "the Recluse," interrupts them in the early part of their session, who gives expression to his disappointments and vexations. He is soothed and quieted by their cheerful songs, and at last is made judge. He decides in favor of the Rose. The coronation then transpires, and after an anthem by the Heather bells, and a general farewell chorus, all return to their homes. The Recluse too is cured of his despondency.

Mr. Root proves himself fully competent to adapt these thoughts to music. The Cantata consists of thirty-six *parts*, so to speak, properly arranged in song, duett, trio, semi-chorus, and chorus. Most of the music is adapted to female voices. It is a very pleasing affair, simple and natural, but expressive and efficient, and ought to be and will be familiarly known. The songs possess great merit, independently of their connection; and the great variety here presented will afford a fund of gratification to those who are debarred from the more *social* arrangements in duetts, trios, &c. The book is sold at 50 cents. By the way, The Musical Institute, (if that is the proper name,) which is to be under the direction of Messrs. Mason & Root, with others, convenes in this city, we believe, in the latter part of April, and will be an occasion of great interest.

Minifie's Mechanical Drawing Book, for Self-instruction. No. 5 is received. It is admirably executed, as were the previous numbers. The value of the work is too well known to need commendation. None but a finished artist can afford to do without it. Dewitt & Davenport are the New-York publishers. Price 25 cents a number.

SCIENTIFIC AND MECHANICAL MONTHLY RECORD.

Lightning-Rods—Iron Ladders.—The Springfield *Republican* (Mass.) says that Messrs. Holland and Hill, of Worcester, have invented a cheap iron ladder, that serves as a good lightning-rod for houses. If those gentlemen have got an article cheap enough to come into general use as a ladder and lightning rod, they are entitled to great credit, for there is a woeful deficiency of both among country houses.

But these Yankees did not forget the city folks. They have also invented a "life-preserver" against fire, which they call a "valise ladder." This is a portable iron ladder which weighs only *seven* pounds, by which any gentleman who is nervous about going into the sixth story of a hotel to sleep can dismiss his fears about fire. When he is assured that the house is actually in flames, he can quietly dress himself. He takes his valise or trunk, and uncoiling the links of the iron ladder, lowers them to the ground. He next lowers his own precious person with dignity and with safety, with his trunk; and jerking off the little ladder, folds it up and seats himself to enjoy the light of the fire.

Great Improvement in Steel.—Great improvements have recently been made in England in steel, especially in cast steel. Messrs. Blake & Parkin, of Meadow Steel Works, Sheffield, are making steam engine piston-rods, said to bear more than double the strain of ordinary cast steel of same thickness, by combining two tempers or different degrees of hardness in one bar—the soft part being inside, the outside being harder, thus combining the two requisites of stiffness and toughness. This peculiar steel is now used extensively by engineers for making their screw-taps. It can be made with the hard temper inside and the soft temper outside, for medal dies, mint dies, &c. Samples are ordered for the Bank of England and the Royal Mint, for their dies. Most of the large engineers in this country and in the United States are bringing this core-annealed steel into use for engine piston-rods and screw-taps. The price

is said to be about the same as ordinary cast steel.—*English paper.*

A New Use of the Leaves of the Pine, (*Pinus Silvestrus.*)—Near Breslau, in Silesia, in a domain called the Prairie of Humboldt, there exist two establishments as astonishing for their produce as for their union. One is a manufactory which converts pine leaves into a sort of cotton or wool; the other offers to invalids, as curative baths, the waters used in the manufacture of that vegetable wool. Both have been erected by M. de Pannewitz, inventor of a chemical process by means of which it is possible to extract from the long and slender leaves of the pine a very filaceous substance which he has named woody wool; it can be curled, felted and woven.

All the aucular leaves of the pine fir, and of the coniferæ in general, are composed of a fibillæ extremely fine and tough, surrounded and held together by a resinous substance under the form of a thin pellicle. When by decoction and the use of certain chemical agents the resinous substance is dissolved, it is easy to separate the fibres, to wash them and free them from all foreign substances. According to the mode of preparation employed, the woolly substance acquires a quality more or less fine, or remains in its coarse state; in the first instance it is used as wadding, in the second to stuff mattresses. If the pine has been preferred to other kinds of pitch trees, it is on account of the length of its needle-shaped leaves. It is thought that a similar result might be obtained from other trees of the same species.

The tree can be stripped of its leaves when quite young without any injury. The operation takes place when they are still green. A man can gather two hundred pounds of leaves a day.

It was first advantageously substituted for cotton and wool in the manufacture of blankets. The hospital of Vienna bought five hundred, and, after a trial of several years, has adopted them entirely. It has been remarked, among other advantages, that no kind of insects would lodge in the beds, and its aromatic odor was found agreeable and beneficial. These blankets have since been adopted by the penitentiary of Vienna, the charity hospital, and the barracks of Breslau.

Its cost is three times less than that of horse-hair, and the most experienced upholsterer, when the wool is employed in furniture, could not tell the one from the other.

This article can be spun and woven, resembling the thread of hemp for its strength; it can be made into rugs and horse blankets.

In the preparation of this wool an ethereal oil of a pleasant odor is produced. This oil is at first green; exposed to the rays of the sun, it assumes an orange-yellow tint; replaced in the shade, it resumes its former green color; rectified, it becomes colorless. It differs from the essence of turpentine extracted from the same tree. It has been found efficient in rheumatism and gout; also as an anthelmintic in cutaneous diseases. Distilled, it is used in the preparation of lac of the finest kind. It burns in lamps like olive oil, and dissolves caoutchouc completely in a short time. Perfumers in Paris use it in large quantities.

It is the liquid left by the decoction of the pine leaves which has been so beneficial in the form of bath. The bath establishment is a flourishing one.

The membranous substance obtained by filtration at the time of the washing of the fibres is pressed in bricks and dried; it is used as a combustible, and produces, from the rosin it contains, a quantity of gas sufficient for the lighting of the factory. The production of a thousand quintals of wool leaves a quantity of combustible matter equal in value to sixty cubic metres of pine wood.

Liquid Glue.—A discovery has been made of a mode of preserving glue in a liquid form, which must be of great value, inasmuch as it may be used when cold. It is prepared as follows:

Dissolve 2 lbs. of strong glue in 1 quart of water, in a glue kettle or in a water bath; when the glue is entirely melted, add, little by little, to the amount of 10 oz. of strong nitric acid. This addition produces an effervescence due to the disengagement of hyponitric acid. When the whole of the acid is added, remove the vessel from the fire and leave it to cool.

New Method of taking Impressions o Seals, Stamps, &c.—Cut a piece of card board, say to the breadth of half an inch, with which form a ring just the dimensions of the impression to be taken. Then pour into the ring which surrounds the spot containing the device, melted "fusible metal." The card will prevent the metal from running away, and as the metal cools, the impression will become fixed, and without injury to the paper from which it was taken. "Fusible metal" is a mixture of 8 parts of bismuth, 5 of lead, and 3 of tin. It liquefies at 212°.

This statement is from the *London Chemist.*

New Enamel for Cards.—Zinc white is used with great success for this purpose, instead of the lead salt.

POISONOUS CHLOROFORM.—Dr. Chas. T. Jackson, the great chemist, has discovered, as he supposes, the cause of the fatal consequences which have resulted from the use of chloroform. He attributes this result to "a poisonous compound of amyle, the hypothetical radical of fusel oil, or the oil of whiskey." When the chloroform is made from pure alcohol, diluted with water, no such accidents occur. When prepared, as it too often is, as a mere matter of *cheapness*, from corn, rye, or potato whisky, deaths began to occur. This discovery, if on further examination the opinion is proved correct, is very important, and will be another step of progress towards overcoming the terrors of surgical operations; and makes far more thorough, because more safe in its application, his original discovery.

SHANGHAI SHEEP.—Sheep all the way from China, good reader! Something of a novelty that. We are accustomed, thanks to Yankee adventure, to the terms Shanghai chickens, Shanghai eggs, &c., but we had no idea that the subjects of the Brother of the Sun and fifty-third Cousin of the Moon had any idea of the value of the wool clip, or the taste of mutton chops. One would imagine that Chinese sheep would be like every thing else that is Chinese; queer, odd, quizzical. But no such thing. These two lambs—for they are young 'uns—are quite as simple, and woolly, and dirty, and respectable looking as the most civilized of their European or American brethren. It's of no use saying "Chow chow" or "Tchi ki" to them; they don't understand the green tea language. A long voyage they have had of it, from Shanghai, on the other side of the globe, to New-York—which is already a trip long enough to frighten any decent sheep—and then from New-York to this city of abominations. They appear to take it quietly, however, and thoroughly to understand the difference between people who wear tight indispensables, and those who sport baggy ones. The two innocent little big lambs propose emigrating to the prairies of Texas shortly, and we expect to hear of their lying down peaceably in the same flock with Mexican and Vermont specimens of their tribe.—*N. O. Picayune.*

STAINED WOODS.—Wood is stained by the application of any of the ordinary liquid dyes employed for wool or cotton. They sink deeper into the wood when applied hot. When the surface is properly stained and dried, it is commonly cleaned with a rag dipped in oil of turpentine, after which it is varnished or polished. Pale-colored woods are stained in imitation of ebony by washing them with, or steeping them in, a strong decoction of logwood or galls, allowing them to dry, and washing them over with a solution of the sulphate or acetate of iron. When dry, wash with clear water, and repeat the process if desired. Mahogany stain: Logwood, two ounces; madder, eight ounces; fustic, one ounce; boil two hours, and apply several times to the wood boiling hot; when dry, slightly brush over with a solution of pearlash, one ounce in one quart of water; finish it off when dry with wax or oil tinged with alkanet. The wood may be previously washed over with strong aquafortis, and when dry, the following stain used: Pure socotrine aloes, one ounce; dragon's blood, half an ounce; rectified spirit, one pint; dissolve, and apply two or three coats to the surface of the wood: finish off as above.—*New-York Evening Post.*

NEW PRINTING MACHINE.—Mr. Robert G. Nicholas, of Illinois, has invented a new Printing Press, of which the following is a description:

The machine is exceedingly simple, consisting of a perpendicular wheel, upon the side of which the form is placed, with conical cylinders, upon which the paper runs, and against which the type makes the impression on the paper. As the wheel or "bed" revolves, the form is passed under inking rollers, then under the impressing cylinders, and the operation is finished.

With a single cylinder, a medium or imperial sheet can be worked off as fast as it can be "fed," and with a double cylinder, will make a double impression with equal celerity. The press is susceptible of enlargement and increase in the number of cylinders, *ad libitum*. But the most important feature of the invention is its adaptation to small newspapers and job-printing; in the latter it is almost invaluable. We have, with a very rude *pine* model, worked off 1500 bills per hour; the impression was of course inferior, but that was incidental to the very rude structure and material of the machine.

The cost, it is said, will not exceed one half that of the present power-presses.

CATTLE.—The cattle growers of Madison county, Ohio, have formed a company, with a capital of ten thousand dollars paid in, to make selections and purchase the best stock from England. A similar company, with a capital of twenty-five thousand dollars, is about being formed in Indiana.

ELIJAH M. REED, of Tewksbury, informs us that he is now making butter from his Ayrshire cow, and obtains one pound from *four quarts* of milk! She was on exhibition at

the Middlesex Show in October last, and was then an animal of fine appearance. He did not state to us the manner of feeding in obtaining this product. One cow producing this amount must be of as much value as two, at least, ordinary cows.—*N. E. Farmer.*

EDITORS' JOTTINGS, ETC.

Railroads in Vermont.—We have often urged the importance of railroad communication to the farming interest. We have recently noticed a statement illustrating this sort of influence, in our friend Walton's excellent journal, published at Montpelier, in that State. He says: "No class of men have been benefited so much as the country farmers. In the vicinity of railroads, all over the country, and especially in Vermont, the iron track has brought customers to the very threshold of their doors, with cash, at an advanced price, for the products of their farms. Their pocket-books are bursting out with bank bills, and their purses with silver and gold dug from the earth without the expense of a trip to California. Not only have the great markets, at a mere trifle of expense for transportation, been brought to their very doors, but the home market is daily extending. According to the *Keene Sentinel*, the rise of agricultural products has been on an average perhaps 33 per cent. within a few years. The thousands of cords of wood consumed extra, and the distant calls for lumber of various kinds, have given a new value to our forest lands. Hemlock bark, timber for wooden ware in large quantities, and latterly masts and sugar-maple keels for ships, are drawn through our streets to the railroad *station*, for eastern ship-yards. All New-England and New-York at least are to be supplied with the finest slate from the Castleton quarries. The mechanics had a good and well-improved harvest, laying a good foundation, while the railroads were building. Indeed, almost every class amongst us have been benefited, with the exception of those who furnished the means of building the road. This is yet only hopeful 'deferred stock;' but the prospect is yearly more encouraging of a fairer remuneration."

Beebe & Co.—We would call the attention of our readers to the splendid *hat* establishment of Messrs. Beebe & Co., No. 156 Broadway. This we believe is one of the oldest and most respectable hat firms of this city; and their reputation for getting up light, substantial and elegant hats is both wide-spread and well-earned; and the magnificent business and success of the establishment are among the best proofs of discernment and discrimination in the bestowment of public patronage. We have tried the articles of their manufacture repeatedly, and have no hesitation in saying they are the *best hats*—wearing longer, and retaining their shape and lustre better than any others we ever used. We therefore heartily recommend to merchants at a distance and all our numerous readers, when they visit the city, to call and examine for themselves.

Exports from New-York in 1852.—The *Journal of Commerce* publishes the following table, showing the value of some of the leading items of imports for the last year:

Cigars,	1,917,118
Coffee,	5,249,640
Hardware and Cutlery,	2,711,236
Hides,	3,005,862
Lead,	1,248,960
Liquors,	1,923,929
Molasses,	955,880
Wines,	1,645,356
Railroad Iron,	3,580,838
Steel,	1,083,554
Sugar,	8,926,690
Tea,	6,398,104
Tobacco,	703,387
Tin,	3,045,320
Watches,	2,183,047

The revenue from cash duties received at that port, shows that a larger proportion of the dutiable imports have been made up of articles of luxury which pay high rates.

Export of Specie for three years is given as follows:

1850,	$9,982,948
1851,	43,743,209
1852,	25,096,255

The merchandize exported for the same three years, ranges between forty-four and fifty millions for each year.

Pet Rats.—I was astonished on visiting the houses of some of the inhabitants (in Siam) to see a huge rat walking quietly about the room, and crawling up the master's legs in a cool, familiar manner. Instead of repulsing it, or evincing any alarm, he took it up in his hands and caressed it; and then I learned for the first time, and to my utter astonishment, that it was a custom prevalent in Bangkok to keep pet rats, which are taken very young, and carefully reared till they attain a perfectly monstrous

size, from good and plentiful feeding. These domestic rats are kept expressly to free the house of other vermin of their own race; and so ferocious are they in the onslaughts they make, that few of the houses are ever annoyed by mice or rats.—*Neale's Residence in Siam.*

Steamboats and their Tonnage.—It appears from the Report of the Steamboat Inspector that the steamboats in the United States are distributed as follows:

	Boats.	Tonnage.
Mississippi and tributaries,	528	151,414
Atlantic,	469	176,425
Pacific,	50	34,986
Lake Erie,	127	58,325
Lake Champlain,	17	4,380
Lake Ontario,	14	6,917
Total steamers and tonnage,	1205	431,547

The largest number of steamers set down to any one place is St. Louis, which has 126, yet its steam tonnage is not half as large as that of New-York, which has 92 boats and 64,447 tonnage. What will strike the reader as not a little remarkable is the number of boats and tonnage centred at San Francisco; its steam tonnage slightly exceeding that of New-Orleans.

Messrs. Meade Brothers, Daguerreotype artists, 233 Broadway, announce themselves officially in our advertising pages. Their room is remarkably well situated for sight-seeing, including within its view the City Hall and the Park, with the busy streets which border upon it. But the interior of the room presents the strongest attractions. It contains over a thousand pictures, among which are found the most eminent persons and places in this country and in Europe. Of these, the names of Webster, Clay, Prof. Morse, Louis Napoleon, Count D'Orsay, Daguerre, (the only life likeness of him in this country,) Kit Carson, Billy Bowlegs, Gen. Lopez, and many others, including most of the eminent officers, actors, poets, &c., of this and of other countries. Among the views are those of Niagara Falls, San Francisco, Shakspeare's home, the Boulevards, Notre Dame, &c., &c. Of the *quality* of his pictures there is but one opinion, and the slightest examination will satisfy any one on that point. Admission is free.

Music in New-York.—We understand that Madame Alboni is about to engage with Salvi and Marini, in this city. This will form a splendid trio, and will be sure to create a great rush for tickets.

Madame Sontag is still here, filling her house every evening. Badiali is as great and Pozzolini as sweet as ever. Rocco is established as an admirable buffo basso; which he acts as well as he sings.

We have had the pleasure of hearing "The Flower Queen" sung by the young ladies of the Spingler Institute. It was a very pleasing exhibition. We heartily commend this cantata to all our higher seminaries. It is not difficult, and is exceedingly pleasing.

The Bridgewater Paint is represented by its proprietors as superior to other paints for ship-chandlers, tin-roofers, stove-makers, carriage-builders, &c., and for ships, and the outside coat of villas, churches, &c. It is also represented as good in all climates. It is highly and extensively commended by the periodical press, and in *Appleton's Mechanics' Magazine.* It is said to be both fire and water-proof.

The American Polytechnic Journal is a monthly, devoted to science, mechanic arts and agriculture, conducted by Prof. Page, J. J. Greenough, and C. L. Fleschmann, at Washington, and at 6 Wall street, New-York. We have seen only the third number, but this gives promise of ability and success.

Results of Accidents.—Some of the most useful inventions owe their existence entirely to accident; such, for instance, as the accidental discovery that plaster of Paris was a non-conductor of heat—a peculiarity to which our "fire-proof safes" are entirely indebted for their usefulness and popularity. The discovery was first made in this city in 1830, by a mechanic, who carried on various branches of smith-work in Eldridge street. Having occasion to heat some water, he took a cast-iron vessel in which plaster of Paris had been used, and to which some had adhered, forming a crust or coating on the inside of the kettle from one half to three fourths of an inch in thickness; he poured in water and put it over a fire, with a view of heating the water sufficiently for his purpose; to his great surprise, after remaining in some time, he found that no change had been made in the temperature of the water; he blew the bellows, rendered the fire still hotter, and was still more surprised, after a long lapse of time, that the water did not become warm: he left the water on the fire, and went on with his work. Returning after some hours, he found the water had only become a little tepid; on this he laid various combustible substances on the fire, but still no effect was produced. Being somewhat puzzled to account for so strange a state of things, he next day instituted a series of inquiries, the result of which was the in-

vention of the celebrated "Salamander Safe," for the privilege of manufacturing which, Mr. Wilder, of this city, pays the discoverer, S. C. Herring, $25,000 a year. So much for having an accident in the family, and properly taking advantage of it.—*New-York Dutchman.*

The Crystal Palace is rapidly going up. The frame of two stories and part of the third is already finished. The glass will be placed in position immediately. It is time to be preparing your goods for exhibition.

Two boats off shore, with a man standing in each boat, each man having a line to the shore. A's line is made fast to a post, and B's line is in the hand of C on shore.

Suppose the three men are equal, and exert themselves with all their power, with perfect skill and toil, to get their respective boats ashore. And suppose further that there is no increase of resistance in consequence of any increase in velocity:

What boat will be ashore first, and relatively how much sooner? G. W.

The First Saw-Mill. — The old practice in making boards was, to split the logs with wedges; and inconvenient as the practice was, it was no easy thing to persuade the world that it could be done in any better way. Saws were afterwards introduced for the purpose of preparing timber and boards, and "saw pits" were then invented for the action of the two-handed saw. This mode of sawing logs was in use in New-England, where water-power could not easily be obtained, in the early part of the present century; and probably there are places yet, where they are known and render useful service. Saw-mills were first used in Europe in the 15th century; but so lately as 1555, an English ambassador having seen a saw-mill in France, thought it a novelty which deserved a particular description. It is amusing to see how the aversion to labor-saving machinery has always agitated England. The first saw-mill was established by a Dutchman, in 1663; but the public outcry against the new-fangled machine was so violent, that the proprietor was forced to decamp with more expedition than ever did a Dutchman before. The evil was thus kept out of England for several years, or rather generations; but in 1768 an unlucky timber merchant, hoping that after so long a time the public would be less watchful of its own interests, made a rash attempt to construct another mill. The guardians of the public welfare, however, were on the alert, and a conscientious mob at once collected and pulled the mill to pieces. Such patriotic spirit could not always last, and now, though we have nowhere seen the fact distinctly stated, there is reason to believe that saw-mills are used in England, propelled by both water and steam-power.

American Chronometers.—The English have manufactured the best chronometers in years gone by, but our own artisans now bear off the palm. The Grinnell Arctic Expedition was furnished with the best of English manufacture, and also with American ones, made by Bliss & Creighton, of New-York. "On the return of the expedition," says the *Annual of Scientific Discovery* for 1853, "it was found that the error of the English instruments was five times greater than that of the American. One of the New-York chronometers, in particular, was subjected to the severest tests to which it is possible to subject instruments of so delicate construction; yet so exquisitely was it provided with adjustments and compensations for the very great extremes of temperature to which it has been subjected, that, having suffered all sorts of exposure to which such instruments are liable in a Polar winter, it was returned with a change in its daily rate, during a year and a half, of only the eighteen-thousandth part of one second in time. In stating this fact, it will be borne in mind that the temperature registered during the winter in Wellington Straits was actually 46° below zero."

Connecticut Industry.—The extent and variety of the industrial products of this State are truly remarkable. We condense the following from a printed document, prepared for the members of the Legislature some two or three years ago:

The extent and variety of the industrial products of this State will appear from the following, which we take from an official document. In New-London, Windham, and Tolland counties, with a population of about 90,000, are 99 cotton mills, 28 iron forges, 13 paper factories, 111 sets woollen machinery, 20 tin factories, 8 comb factories, 43 saddle, trunk and harness makers, 8 brass foundries, and 82 coach and wagon factories; and many other branches of mechanical labor, too numerous to mention in detail. We find also the following list of manufactured articles, viz.: $100,000 worth of cordage; $132,000 worth of leather; 62,400 pairs of boots; 5,865,000 pairs of shoes; 34,700 pairs of hosiery; 123 tons of iron chain; 600 scythes; 6,500 axes; 1,300 tons of hollow ware; 81,700 hats; 496,000 gallons of linseed oil; $10,800 worth of glass; 10,000,000 of lumber prepared for the market; 1,500,000 shingles, and $27,750 worth of snuff and cigars—all this in a population less than that of the city of Boston.

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WATER WHEELS.

The Subscribers offer for sale "Jagger's Improved French Turbine Water Wheel," which they believe to be unrivalled. Circulars and Tables relating to the same may be obtained at this office, or will be forwarded to any one desiring them.

JAGGER, TREADWELL & PERRY,
Nov. 13-tf. No. 110 Beaver street, Albany, N. Y.

LOGAN VAIL & CO.,

NO. 9 GOLD STREET, N. Y.,

AGENTS FOR

GEORGE VAIL & CO., Speedwell Iron Works,

Have constantly on hand Saw Mill and Grist Mill Irons, Brass Screws, Bogardus's Horse Powers, and will take orders of Machinery of any kind, of iron and brass; Portable Saw Mills and Steam Engines, Saw Gummers of approved and cheap kinds, Gearing, Shafting, large and small, cast or of wrought iron.

April 17. 1 y.

FOR SALE,

IMPROVED SHORT-HORN & ALDERNEY CATTLE,

Of different ages; the greater part of them bred on the farm of Thomas P. Remington, Esq. Many of the Short Horns are descendants of the herd of the late Mr. Bates, of Kirkleamington, England, justly celebrated as one of the best and most scientific breeders of the age. The Alderneys have been bred directly from the best imported Stock. The Cows are unrivalled as rich Milchers. Apply to

AARON CLEMENT, Agent
for the purchase and sale of improved Stock, &c.,
Sept. tf. **Cedar Street, above Ninth Street, Philadelphia.**

FARMERS' BOILERS, OR LAUNDRY KETTLES,

OF ALL SIZES, FOR SALE BY

BARTLETT, BENT & SON,

Mar. 1y.* **No. 238 WATER STREET, New-York.**

REDUCTION IN THE PRICE
OF

BOGLE'S HYPEREON FLUID,

FOR RESTORING, PRESERVING and ADORNING
THE

HAIR,

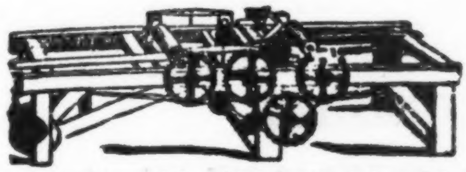
To the following low rates, viz:—Bottles formerly sold at 50 cents reduced to 25 cts. Bottles formerly sold at 75 cents reduced to 50 cts. " $1.00 " " 75 "

The many worthless imitations of this celebrated Hair Restorative, palmed on the public under the lure of cheapness, has determined the Inventor to crush them, by selling his famous "Fluid" at even a lower price than they can afford to sell their vile trash. At the same time he assures the public that the "Hyperion" will always continue to be as good as heretofore, which has given it celebrity throughout the globe. This, with Bogle's "Electric Hair Dye," and other preparations, are sold by his Agents every where in the United States and Canadas.

Dec. 6t.*

1852-56.

WOODWORTH'S Patent Planing, Tonguing, Grooving, and Rabeting Machine.



RECENT Decisions and Jury trials having fully and finally established all the claims of the Woodworth Patent, the subscriber is now prepared to furnish the most perfect planing machines ever constructed, and to license parties to use them in the counties of Allegany, Broome, Cattaraugus, Chenango, Columbia, Duchess, Fulton, Madison, Montgomery, Otsego, Putnam, Queens, Rockland, Suffolk, Tioga, Tompkins, Ulster, Washington, Westchester, Wyoming, Yates, and the other *unoccupied towns and counties in the State of New-York; and in the northern half of the State of Pennsylvania*, in the counties of Bradford, Crawford, Clinton, Elk, Lawrence, Lycoming, Luzerne, Mercer, M'Kean, Pike, Potter, Susquehanna, Tioga, Wayne, Warren, and Wyoming.

THIS JUSTLY CELEBRATED MACHINE was patented December 27, 1828, and the patent having been extended to the 27th day of December, 1856, it has now FIVE YEAR'S UNEXPIRED TERM. This machine, at one operation, reduces to a thickness, and planes, tongues, grooves, beads, and rabets in the best manner, 3 000 FEET OF BOARDS OR PLANK IN AN HOUR; and is also extensively used for planing, sticking, &c., door, sash, and blind stuff, and for sticking mouldings. All kinds of planing are performed by it in a better manner, and more expeditiously and cheaply, than it can be done by any other machine. The price of a complete machine is from $150 to $760, according to size and capacity. From 4 to 10 horse-pow r will drive the machine, and it will run for years without repairs.

Nine tenths of all the planed lumber used in our large cities and towns is now dressed with Woodworth's Machines. Those manufactured by the subscriber may be seen in constant operation in the Steam Planing Mills at Albany, Astoria, Canisteo, Dunkirk, Elmira, Flushing, Gibson, Jamestown, Leroy, Lockport, Newburg, Olean, Stapleton, Syracuse, Warrensburg, &c.

For Machines and Rights to use them in the unoccupied towns and counties in New-York and the northern half of Pennsylvania, apply to

JOHN GIBSON, Planing Mills,
Albany, N. Y.

Apr. 17–tf.

Manufacturers' Supply Store.

OSCAR SCHENCK & CO.,

No. 132 WATER STREET,

(Corner of Pine,) NEW-YORK.

DEALERS in Cotton, Woollen, Silk, and Carpet Manufacturers' Articles, and manufacturers of

WEAVERS' REEDS, HEDDLES, BOBBINS, SPOOLS.

Agents for the sale of the latest improved Shearing and Napping Machines, Wool Pickers, Cloth Winders, Regulators, Satinet Warps, &c. Oils, Sperm, Lard and Olive, and Oil Soap.

NEW-YORK WIRE RAILING WORKS.

SPECIAL attention is invited to a new improvement in the manufacture of *Wire Iron Railing and Grating*, for all purposes where wood, cast or wrought iron are used, at half the cost; to wit,—for Cemeteries, public and private grounds, farms, balconies, verandahs, alcoves, &c., from 50 cts. to $2 per lineal foot.

Portable and *permanent* Wire Fence for railroads, farms, parks, lawns, &c., manufactured on an entirely new plan, from 9 to 18 cts. per foot, 4½ feet high, with Iron Posts.

The *Portable Iron Bedstead*, exceedingly ornamental, is so constructed as to fold up into a convenient form for transportation, and only requires to be seen to be adopted.

N. B.—All kinds of Wrought or Cast Iron Buildings made to order, and Designs and Circulars procured by addressing the manufacturer and proprietor,

JOHN S. WICKERSHAM,
240 Broadway.

Warerooms of the New-York Patent Machine Shop.

Works 59 and 61 Lewis street.

Agents, C. B. C. & Co., 215 Pearl street.

Medals have been awarded for the above, both by the Am. Institute of N Y., and by the Franklin Institute of Philadelphia.

Mar. 13–1y.

George W. Putnam's

PATENT

SAW-FILING MACHINE.

THE Subscriber [sole proprietor of the above Patent] keeps Machines constantly on hand at Glenn's Falls, Warren Co., N. Y. Will ship to order, to any part of the United States. Putnam's Machine, attended by one man, will file more saws in a given time than three men by hand in the old way, and do the work much better, at a great saving of files and saws. Lumbermen will find it to their interest to have one of these machines upon their mills. Terms for a single Machine, with right of use, Seventy-five Dollars.

ALBERT H. CHENEY.

July 17, 1852.

QUARTZ MINING MACHINERY

The Subscriber is extensively engaged in manufacturing Machines for stamping Quartz Rock, for Virginia and California, and has made several improvements by which he can pulverize more than three times the quantity of Quartz Rock, and with less power, than any other machinery in the country.

Also an improved Amalgamator by which every particle of gold can be collected. Miners who have used the Erasters or shaking tables, and have collected a large amount of sand, can use these machines to work the sand over, paying them a han some profit.

Persons wishing to go into the Quartz mining business wou do well by calling on the subscriber, who has had several yea experience in manufacturing machinery for mining.

Mar 27–1y. WM. BURDON, *Machinist*,
102 Fulton street, Brooklyn.

NEW IMPROVEMENT
IN
PLANING MACHINES.

Having received letters patent for my New Improved Planing Machine for planing boards and planks, I now offer for sale Machines and Rights for States, Counties, or Cities. My Improved Machine is unlike all others in its operation, and it will produce more work and of better quality than any others now in use. The principles of its operation are simple, as there are no gear or belts in or about the machine, these being all placed beneath the floor. The amount of work done is only limited by the number of persons feeding the machine. A matching apparatus works in connection with this machine, by which the Boards are planed and matched in the same operation. Th planing and matching are superior to that produced by the han plane; and both sides of the board are planed at the same tim if desired.

One of these machines will be in full operation at the Machin Shop and Foundry of Messrs. F. & T. Townsend in this city b the 1st of June next, where it can be seen.

GEORGE W. BEARDSLEE,
Residence 764 Broadway, Albany.

June 5th.

A. HALL'S
Fire-Brick Works,
PERTH AMBOY, N. J.

A large stock of the best No. 1 Fire Brick constantly on hand. Vessels of any draft can load at any stage of the tide and season of the year.

Shapes.—Large and small Bull-Heads, in walls, from 5 feet to 8½ feet circle; Wedges, Split Brick, Soaps, Cupola, for any cirle, from 18 inches to 30 inches, constantly on hand.

Kaolin of the best quality.

One Million Bricks can be made at this factory in six months and none are made from October to April. All orders for un usual shapes should be given in the Spring, as bricks are *bette* and made much *cheaper* in the *summer months*. Vessels loaded with dispatch. Orders promptly executed. Mar. 3, 1852.

A. W. CARY'S ROTARY FIRE-ENGINE PUMPS.

The Inventor, after thoroughly testing this engine pump, (fo the past two years,) feels confident that it is not equalled by any thing now in market, in the way of raising or forcing water: the motion being rotary, the stream is constant, without the aid of an air vessel. The packing is self-adjusting, very durable, and cannot well get out of order.

These pumps are well calculated for all the purposes for which pumps or hydrants may be used, viz., Factories, Steamboats, Tanneries, Breweries, Distilleries, Railroads, Water Stations, Hotels, Mines, Garden Engines, &c.

Among the many testimonials given of this pump, is a gold medal awarded at the last great Fair of the American Institute.

No. 1 is a house or well pump and domestic Fire Engine, and will raise from 20 to 30 gallons per minute.

No. 2 will raise 100 gallons at 120 revolutions.
No. 2½ " 200 " 120 "
No. 3 " 300 " 120 "

The quantity raised can be doubled, by doubling the revolutions. These machines are manufactured and sold by the subscribers at Brockport, N. Y., also in this city, 48 Courtland street, (corner of Greenwich,) by J. C. CARY.

Sept. 18–1y. CARY & BRAINERD.

Machinists' and Manufacturers' Tools.

O. SNOW & Co., Union Works, Meriden, Ct., having increased heir facilities for manufactu-ing Lathes, Planers, &c., have now n hand, finished and finishing off, Slide Lathes, of a variety of zes and lengths, at prices varying from $125 to $900, according o size and finish; also, Hand and Power Planers for Iron, 2, 3½, 6, and 10 feet Beds. Milling Machines, Hand Lathes, with or without Iron Beds, comprising six different sizes, all of the most approved construction, and warranted of the best quality of work.

Nov. 13–6m.*

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IGHLAND NURSERIES, NEWBURGH, N. Y.

A. SAUL & CO.,

; inviting the attention of their Patrons and the Public in eral to their very extensive Collection of

ruit and Ornamental Trees, Shrubs, &c.,

Would respectfully inform them that the stock which they for sale the coming spring is unusually fine, both as re- quality of trees, variety of kinds, &c., &c.

he soil and climate of our Hudson Highlands have rendered verbial the success of the trees sent from here to all parts he Union; and the accuracy and precision so indispensable he propagation of fruit trees for which this establishment long been celebrated, render errors in nomenclature of occurrence.

hey have propagated in large quantities, all the *leading dard* varieties which are proved best adapted for general ivation, especially those recommended by the American Po- logical Society, as well as all *novelties*, both of *native* and *eign* origin.

o particularize within the limits of an advertisement would impossible; they refer to their General Catalogue, a copy of ich will be sent to all *post-paid* applicants, on enclosing a t-office stamp.

he following comprise a portion of their Stock, and are all a fine growth: viz:

ears in over 400 Varieties, both Standards on their own k for orchard culture, and on the Quince for Dwarfs, Pyra- ds, and Quenouclo for Garden Culture.

Apples in over 300 varieties, both Standards and Dwarfs, Also, Cherries, both Standards and Dwarfs, Plum, Apricot, Peach, Nectarine, and Quince trees in every variety.

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Ornamental Trees, Shrubs and Vines, both deciduous and evergreen, suitable for street and lawn planting, embracing all the new and rare Conifers, Weeping Trees and Shrubs of recent introduction.

Roses in every variety, including Hybrid Perpetual, Hybrid Bourbon, Hybrid China, Hybrid Damask, Prairie Boursault, Ayrshire, and other hardy climbing and Garden Varieties, as well as the more tender—Tea, China, Bengal, Bourbon, and Noisette Varieties.

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Dahlias and bedding plants for the parterre and flower garden, in large quantities and varieties.

Hedge Plants: 100,000 Buckthorn and Osage Orange plants, two years' growth; Arbor Vitæ for Screens, &c., &c.

Dealers and Planters of trees on a large scale will be dealt with on the most liberal teım

A. SAUL & Co.

Newburgh, Feb. 20, 1853.

UMPS, FIRE ENGINES,

FOUNTAINS, &c.

he subscriber manufactures Double-Acting Lift and Force mps, which from their simple construction and little liability disorder, (or when in any way deranged, they are very read- examined for the trouble,) are well calculated for Southern d West India Markets, for Factories, Mines, Railroad Water tions, Breweries. Tan Works, Stationary Fire Engines, Ships, amboats, Family Purposes, Hydropathy Establishments, or any purpose for which Pumps may be required. I manu- ture them of any size required.

VILLAGE AND FACTORY FIRE ENGINES.

ey have a Double-Acting Lift and Force Pump, they are ht, easily handled, and worked by four men.

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r any depth required, either for manual or other forms of wer. They are entirely of metal.

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GARDEN ENGINES with a small size Double-Acting Lift and Force Pumps, so arranged upon two wheels that one person can wheel them from place to place, and are well calculated for Agricultural and Horticultural purposes, Washing Windows, and can be used in case of fire.

ORNAMENTAL CAST IRON FOUNTAINS,

Of various descriptions and sizes, with Jets of various descriptions, Copper Riveted Hose of all sizes, used for fire purposes, Molasses, or Locomotives. Lead, Cast Iron, Wrought Iron, and Gutta Percha Pipes. Brass Coupling of all sizes and descriptions. Copper Work, &c., &c.

Purchasers are respectfully invited to call, or any communication by mail will have immediate attention.

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Feb. 1853. **34 CLIFF STREET, (up Stairs,) NEAR FULTON.**

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FULTON IRON WORKS, TROY, N. Y.

BUILDER of Steam Engines and Boilers of various patterns and sizes, and with the late improvements: also, his improved rtable Steam Engines and Boilers combined, occupying but little space, economical in fuel, safe and easily managed. These ngines are well adapted to Railroad Depots, for sawing and pumping, requiring no brick to set them. Double Action, Lift, and rce Pumps, for pumping Mines, &c.; Shafting and Pulleys, for Factories, Tools for Machine Shops. Brass Castings and Ma- hinery made to order at the shortest notice.

March, 3m*

NEW PATENT RIGHT FOR SALE.

State Rights to make and sell the premium machine for Paring, Coring, and Quartering Apples, &c., patented on the 25th anuary, 1853, and illustrated in the April number of the Plough, Loom, and Anvil, can be had at reasonable prices, by applying, ost-paid, to the sole proprietors,

SMITH & FENWICK, 14 Vandam street, N. Y.

BELLS! BELLS! BELLS!

THE subscribers manufacture and keep constantly on hand, Church, Factory, Steamboat, Locomotive, Plantation, and School-house Bells, varying in weight from 10 lbs. to 4,000 lbs., with the most approved hangings.

At this Establishment small Bells pass through the same process in manufacturing as large ones, and we flatter ourselves that the Bells turned out at this Foundry are superior in point of tone and work ship to those of any other in the Union.

We have 13 Gold and Silver Medals which have awarded for the *best* Bells. The patterns have been imp upon for the past thirty years. Communications by ma receive prompt attention. Orders for Bells of any size c filled as soon as received.

Address, at West Troy, N. Y., **A. MENEELY'S SONS.**

Hitchcock & Co., Agents, 116 Broadway, New-York.

MATHEMATICAL INSTRUMENTS FURNISHED, OF THE BEST DESCRIPTION. Dec. '52, eom

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DAGUERREOTYPE ARTISTS

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DAGUERREOTYPE GOODS,

233 BROADWAY, NEW-YORK, **Four doors above the Astor Hou**

MEMBERS OF THE SOCIETE LIBRES DES BEAUX ARTS, PARIS.

Daguerreotypes taken in every style known in the Art, daily. We have received 7 Medals, 8 Diplomas, and Presents and complimentary Letters from the Crowned Heads of Europe, for the superiority of our Pictures.

P. S.—Meade Brothers will open a branch of their Establ ment, on or about the 1st of May next, in the city of Willia burgh, L. I., which will be conducted on the same lib scale for which their New-York establishment is so celebra

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CHAPIN'S PATENT DUPLICATE TURNER.

THE IMMENSE VARIETY OF SCROLL, WAVE, AND Serpentine work, to which this machine is adapted, is for purposes of an unlimited multiplicity, and its capacity for rapid progress is equal to its variety of work.

For example see Fig. 2 on another page.

The horizontal cut in this fig. is a partial representation of a Cottage Bedstead post 4 inches wide and 1½ thick, one hundred of which are turned at a time, or at what is called one mill full, and from 2 to 3 mills full are turned in a day, the cylinder being 4 feet in diameter.

In this way fence pickets are beautifully ornamented from end to end if desired; new styles chair stuff, table legs, scroll feet, fancy table frames, drawer fronts, new style stair balusters, picture frames, wave moulding, tree boxes, grape arbors, architectural decorations for country residences, &c., &c., are elegantly and smoothly turned out, with waved surfaces if desired, which are beyond the reach of all other practices of present day.

Another and still more splendid adaptation of this machin to the manufacture of DRIGGS & CHAPIN'S patent wave blind lath, which are now coming into use in this city. Bl lath being thin, large quantities are made at a time. See F 2, on first page. Address

DRIGGS & CHAPIN,

124 Amity Street, New-Yor

Where one of the machines is in operation, and where ord for Machines, their work, and rights of using, are solicited.

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J. F. DRIGGS, } PROPRIETORS.
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THE STOWELL EVERGREEN SWEET CORN.

A QUANTITY of this new and valuable variety, from seed raised by Professor J. J. Mapes, LL. D., for sale. Per bushel, $16: peck, $5; half peck, $3; quart, $1; sent by express or mail to any part of the country, on receipt of the money by post. This is beyond all doubt the best and most prolific kind of Sweet Corn ever grown. No Farmer should be without it. With ordinary care it will repay cost a hundred times over the first season.

DIRECTIONS.—A quart of the seed will plant one tenth of an acre, four to five kernels to the hill. Prepare ground well. Cultivate like common corn. It may be planted any time before the middle of June; Earlier better.

[From the Working Farmer.]

"We have long been convinced that sweet corn would prove superior as green fodder to any other; and the only objection urged against its use has been the smaller yield per acre compared with other kinds. We are now prepared to recommend the use of Stowell's Evergreen Corn for this purpose. The stalks are nearly as sweet as those of sugar-cane, and DOUBLE THE QUANTITY can be grown to the acre, to that resulting from ordinary sweet corn."

Another advantage claimed for this corn by Prof. Map though the subscriber does not endorse it, is, that when desir it may be kept GREEN AND FRESH ALL THE YEAR ROUND.

[Prof. Mapes, in the "Working Farmer," gives the follo ing directions for preserving the Stowell Evergreen Swe Corn:—]

"The ears should be gathered when fully ripe, and the hu should be tied at the nose, (silk end,) to prevent drying, wh THE CORN WILL KEEP SOFT, WHITE, AND PLUMP FOR MOR THAN A YEAR, if in a dry and cool place. At the dinner of th Managers of the Fair of the American Institute, last year, w presented them with this corn of two successive years' growt boiled, and there was no perceptible difference between the tw This year we sent to the Fair one stalk containing eight fu and fair ears, and could have sent many hundred stalks o six ears each."

Many other recommendatory notices might be given.

All orders promptly supplied.

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